



## Measurement of RF Emissions from a Wireless Video System Transmitter Model NOTIFI

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For	HeathCo LLC 2445 Nashville Rd Bowling Green, Kentucky 42102
P.O. Number	N/A
Date Tested	October 27, 2015 to January 13, 2016
Test Personnel	Richard King
Test Specification	FCC "Code of Federal Regulations" Title 47 Part15, Subpart C

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### **REVISION HISTORY**

Revision	Date	Description
—	19 Jan 2016	Initial release
A	Jan 21, 2016 By R. King	<ul style="list-style-type: none"><li>- Added "Rev. A" to the cover page and each additional page of the report.</li><li>- Adjusted the duty cycle calculation on page 8.</li></ul>



## Measurement of RF Emissions from a Wireless Video System, Model No. NOTIFI Transmitter

### 1. INTRODUCTION

#### 1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on a Wireless Video System, Model No. NOTIFI, Serial No. 9D80, (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was designed to transmit at approximately 433.9MHz using an internal. The EUT was manufactured and submitted for testing by HeathCo LLC located in Bowling Green, Kentucky.

#### 1.2. Purpose

The test series was performed to determine if the EUT meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.231 for Intentional Radiators. Testing was performed in accordance with ANSI C63.4-2014.

#### 1.3. Deviations, Additions and Exclusions

There were no deviations, additions to, or exclusions from the test specification during this test series.

#### 1.4. EMC Laboratory Identification

This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by The American Association for Laboratory Accreditation (A2LA). A2LA Certificate Number: 1786.01.

#### 1.5. Laboratory Conditions

The temperature at the time of the test was 21°C and the relative humidity was 31%.

### 2. APPLICABLE DOCUMENTS

The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart C
- ANSI C63.4-2014, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
- ANSI C63.10-2013, " American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"

### 3. EUT SETUP AND OPERATION

#### 3.1. General Description

The EUT is a HeathCo LLC, Wireless Video System, Model No. NOTIFI. A block diagram of the EUT setup is shown as Figure 1.

##### 3.1.1.Power Input

The EUT obtained 115V 60Hz power via an E26 Edison Screw Base Light Receptacle. For the purposes of testing, the receptacle was connected to a 3 wire, 6 foot long, unshielded power cord. The high and low leads were connected through a line impedance stabilization network (LISN) which was located on the ground plane. The network complies with the requirements of Paragraph 4.1.2 of ANSI C63.4-2014.

### 3.1.2. Peripheral Equipment

No peripheral equipment was submitted with the EUT.

### 3.1.3. Signal Input/Output Leads

No interconnect cables were submitted with the EUT.

### 3.1.4. Grounding

The EUT obtained 115V 60Hz power via an E26 Edison Screw Base Light Receptacle. For the purposes of testing, the receptacle was connected to a 3 wire, 6 foot long, unshielded power cord. The high and low leads were connected through a line impedance stabilization network (LISN) which was located on the ground plane. The network complies with the requirements of Paragraph 4.1.2 of ANSI C63.4-2014.

## 3.2. Software

For all tests, the EUT had Firmware Version 0.0.8.1 loaded onto the device to provide correct load characteristics.

## 3.3. Operational Mode

For all tests, the EUT and all peripheral equipment were placed on a non-conductive stand per ANSI C63.10. ANSI C63.10 states for frequencies below 1GHz the non-conductive stand shall be 80cm and frequencies above 1GHz the non-conductive stand shall be 150cm.

The EUT was set to transmit at 433.9MHz.

For the conducted emissions testing, the EUT was in the Video Streaming mode. In video streaming mode the EUT was operating in normal operation transmitting and receiving via WIFI to a remote server. The EUT could be controlled from a web browser at the remote location.

The cables were manually maximized during the preliminary emissions sweeps. The cable arrangement which resulted in the worst case emissions was utilized.

## 3.4. EUT Modifications

No modifications were required for compliance to the FCC 15.231.

# 4. TEST FACILITY AND TEST INSTRUMENTATION

## 4.1. Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 for site attenuation.

## 4.2. Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1.

Conducted and radiated emission measurements were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths and detector functions specified by the FCC. The receiver bandwidth was 120kHz for the 30MHz to 1000MHz radiated emissions data and 1MHz for the 1000MHz to 5000MHz radiated emissions data.

## 4.3. Calibration Traceability

Test equipment is maintained and calibrated on a regular basis with a calibration interval no greater than 2 years. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

#### 4.4. Measurement Uncertainty

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty for these tests is presented below:

Conducted Emissions Measurements		
Combined Standard Uncertainty	1.06	-1.06
Expanded Uncertainty (95% confidence)	2.12	-2.12

Radiated Emissions Measurements		
Combined Standard Uncertainty	2.09	-2.09
Expanded Uncertainty (95% confidence)	4.19	-4.19

### 5. TEST PROCEDURES

#### 5.1. Powerline Conducted Emissions

##### 5.1.1. Requirements

Since the EUT was powered by internal batteries, no conducted emissions tests were required.

#### 5.2. Periodic Operation Measurements

##### 5.2.1. Requirements

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. Also, a transmitter activated automatically shall cease transmission within 5 seconds after activation.

##### 5.2.2. Procedures

The spectrum analyzer was setup to display the time domain trace. The EUT was set to transmit normally. The spectrum analyzer was used to record the amount of time that the EUT remained active following activation.

##### 5.2.3. Results

The plot of the periodic timing is shown on data page 19. The data shows that the EUT ceases operation within the allotted time.

#### 5.3. Duty Cycle Factor Measurements

##### 5.3.1. Procedures

The duty cycle factor is used to convert peak detected readings to average readings. This factor is computed from the time domain trace of the pulse modulation signal.

With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer. This trace is obtained by tuning center frequency to the transmitter frequency and then setting a zero span width with 10msec/div. The amplitude settings are adjusted so that the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the beginning and end of a word period. If the word period exceeds 100 msec the word period is set to 100 msec. The on-time and off-time are

then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period. The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time).

The EUT uses on off keying as the pulse train. The pulse train is made up of 13 bits. One enable bit, 8 address bits and 4 data bits. The duty cycle was calculated as  $20 \cdot \log \left( \frac{\text{on-time}}{\text{on-time} + \text{off-time or the word}} \right)$ .

Enable bit = 320.2uS

8 Address Bits = largest bit is 681.4uS

4 data bits = largest bit is 681.4uS

Assuming worst case address and data bits being 681.4uS

On Time = 360.2uS + (681.4uS\*12)

On-Time + Off-time = 28.7mS

Duty cycle =  $20 \cdot \log \left( \frac{360.2\text{uS} + (681.4\text{uS} \cdot 12)}{28.7\text{mS}} \right) = -10.8 \text{ dB}$

### 5.3.2.Results

The plot of the duty cycle is shown on data pages 22 and 23. The duty cycle factor was computed to be -3.1 dB.

## 5.4. Radiated Measurements

### 5.4.1.Requirements

The EUT must comply with the requirements of FCC "Code of Federal Regulations Title 47", Part 15, Subpart C, Section 15.205 et seq.

Paragraph 15.231(b) has the following radiated emission limits:

Fundamental Frequency MHz	Field Intensity uV/m @ 3 meters	Field Strength Harmonics and Spurious @ 3 meters
260 to 470	3,750 to 12,500*	375 to 1,250*

\* - Linear Interpolation

For 433.9MHz, the limit at the fundamental is 10996.7uV/m @ 3m and the limit on the harmonics is 1099.7uV/m @ 3m.

In addition, emissions appearing in the Restricted Bands of Operation listed in paragraph 15.205(a) shall not exceed the general requirements shown in paragraph 15.209.

### 5.4.2.Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

A preliminary radiated emissions test was performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 30MHz to 5.0GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity.



The final open field emission tests were then manually performed over the frequency range of 30MHz to 4000MHz. Between 30MHz and 1000MHz, a tuned dipole antenna was used as the pick-up device. A broadband double ridged waveguide antenna was used as the pick-up device for all frequencies above 1GHz. All significant broadband and narrowband signals were measured and recorded. The peak detected levels were converted to average levels using a duty cycle factor which was computed from the pulse train.

To ensure that maximum or worst case, emission levels were measured, the following steps were taken:

- 1) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
- 2) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
- 3) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.
- 4) For hand-held or body-worn devices, the EUT was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.
- 5) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer and the antenna cannot be raised to 4 meters. The measuring antenna is raised or lowered as much as the cable will allow and the EUT is rotated through all axes to ensure the maximum readings are recorded.

#### 5.4.3.Results

The preliminary plots, with the EUT transmitting at 433.9MHz, are presented on data pages 24 and 27. The plots are presented for a reference only, and are not used to determine compliance.

The final open area radiated levels, with the EUT transmitting at 433.9MHz, are presented on data page 28. As can be seen from the data, all emissions measured from the EUT were within the specification limits.

Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figures 3 and 4.

### 5.5. Occupied Bandwidth Measurements

#### 5.5.1.Requirement

In accordance with paragraph 15.231(c), all emissions within 20dB of the peak amplitude level of the center frequency are required to be within a band less than 0.25% of the center frequency wide.

#### 5.5.2.Procedures

The EUT was placed on an 80cm high non-conductive stand. The unit was set to transmit continuously. With an antenna positioned nearby, occupied bandwidth emissions were displayed on the spectrum analyzer. The resolution bandwidth was set to 30 kHz and span was set to 2 MHz. The frequency spectrum near the fundamental was plotted.

#### 5.5.3.Results

The plot of the emissions near the fundamental frequency is presented on data page 29. As can be seen from this data page, the transmitter met the occupied bandwidth requirements.

## 6. OTHER TEST CONDITIONS

### 6.1. Test Personnel and Witnesses

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated.

### 6.2. Disposition of the EUT

The EUT and all associated equipment were returned to HeathCo LLC upon completion of the tests.



## **7. CONCLUSIONS**

It was determined that the HeathCo LLC Wireless Video System, Model No. NOTIFI, Serial No. 9D80, did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.205 et seq. for Intentional Radiators, when tested per ANSI C63.4-2014.

## **8. CERTIFICATION**

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specifications.

The data presented in this test report pertains to the EUT at the test date. Any electrical or mechanical modification made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST or any agency of the Federal Government.

## 9. EQUIPMENT LIST

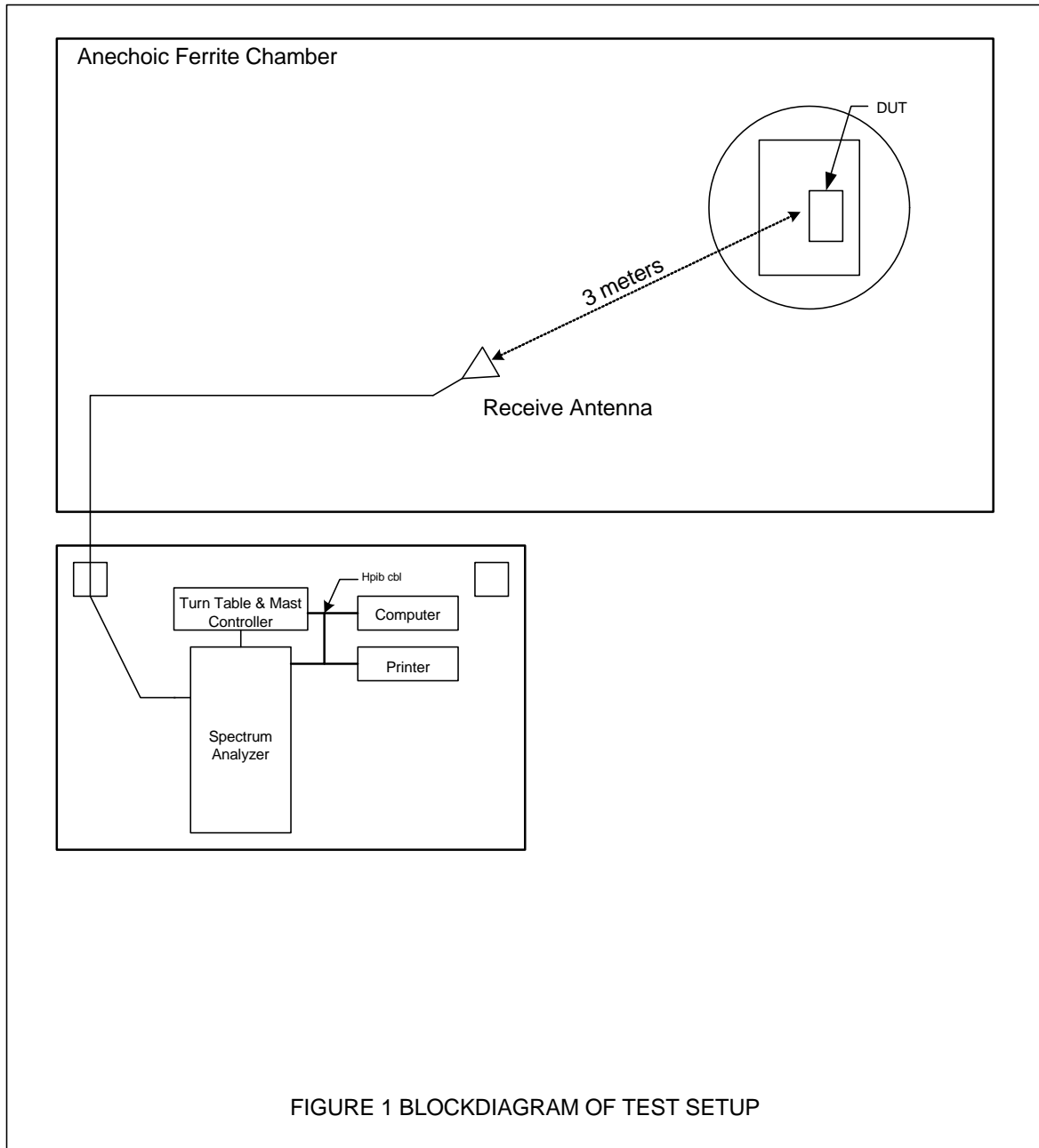
**Table 9-1 Equipment List**

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW0	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-30-20G20R6G	PL2926/0646	20GHZ-26.5GHZ	2/17/2015	2/17/2016
APW11	PREAMPLIFIER	PMI	PE2-35-120-5R0-10-12-SFF	PL11685/1241	1GHZ-20GHZ	3/5/2015	3/5/2016
CDY0	WORKSTATION	ELITE	WORKSTATION		WINDOWS 7	N/A	
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NTA3	BILOG ANTENNA	TESEQ	6112D	32853	25-1000MHz	3/27/2015	3/27/2016
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	2/9/2014	2/9/2016
PLF1	CISPR16 50UH LISN	ELITE	CISPR16/70A	001	.15-30MHz	5/20/2015	5/20/2016
PLF3	CISPR16 50UH LISN	ELITE	CISPR16/70A	003	.15-30MHz	5/20/2015	5/20/2016
RAKI	RF SECTION	HEWLETT PACKARD	85462A	3411A00181	0.009-6500MHZ	3/12/2015	3/12/2016
RAKJ	RF FILTER SECTION	HEWLETT PACKARD	85460A	3330A00154	---	3/12/2015	3/12/2016
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	2/13/2015	2/13/2016
RBE0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU26	100095	20Hz-26GHz	3/6/2015	3/6/2016
RBE2	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU26	100160	20Hz-26GHz	3/4/2015	3/4/2016
T2DH	20DB, 25W ATTENUATOR	WEINSCHTEL	46-20-34	BN1039	DC-18GHZ	8/7/2015	8/7/2016
T2S6	20DB 25W ATTENUATOR	WEINSCHTEL	46-20-34	BV3539	DC-18GHZ	10/13/2015	10/13/2016
XLT4	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	---	DC-2GHZ	1/14/2016	1/14/2018
XLTD	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	---	DC-2GHZ	2/3/2015	2/3/2016
XOB1	ADAPTER	HEWLETT PACKARD	K281C	10422	18-26.5GHZ	NOTE 1	
XPR0	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000	001	4.8-20GHZ	9/22/2015	9/22/2016

I/O: Initial Only

N/A: Not Applicable

Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.



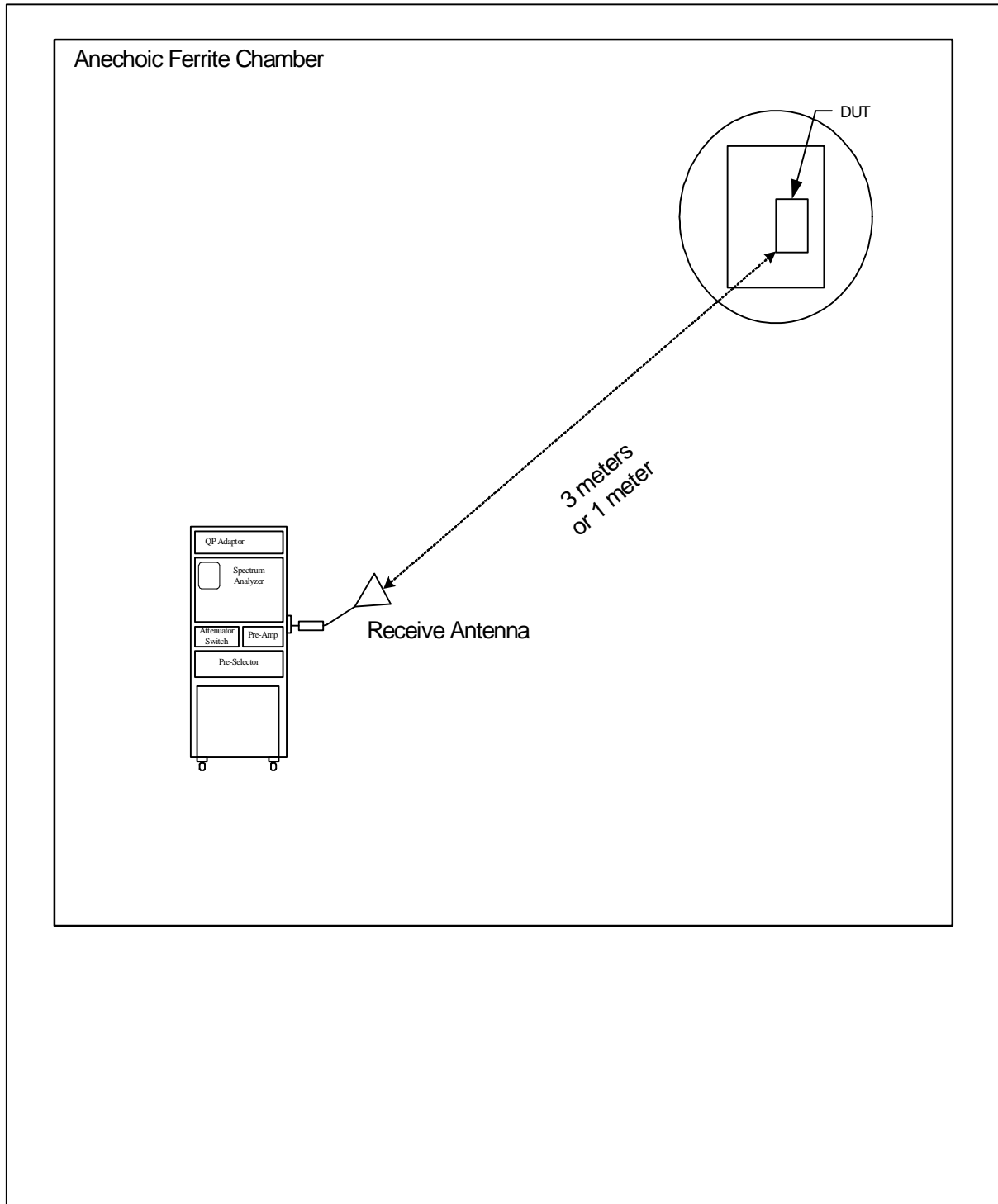


Figure 2

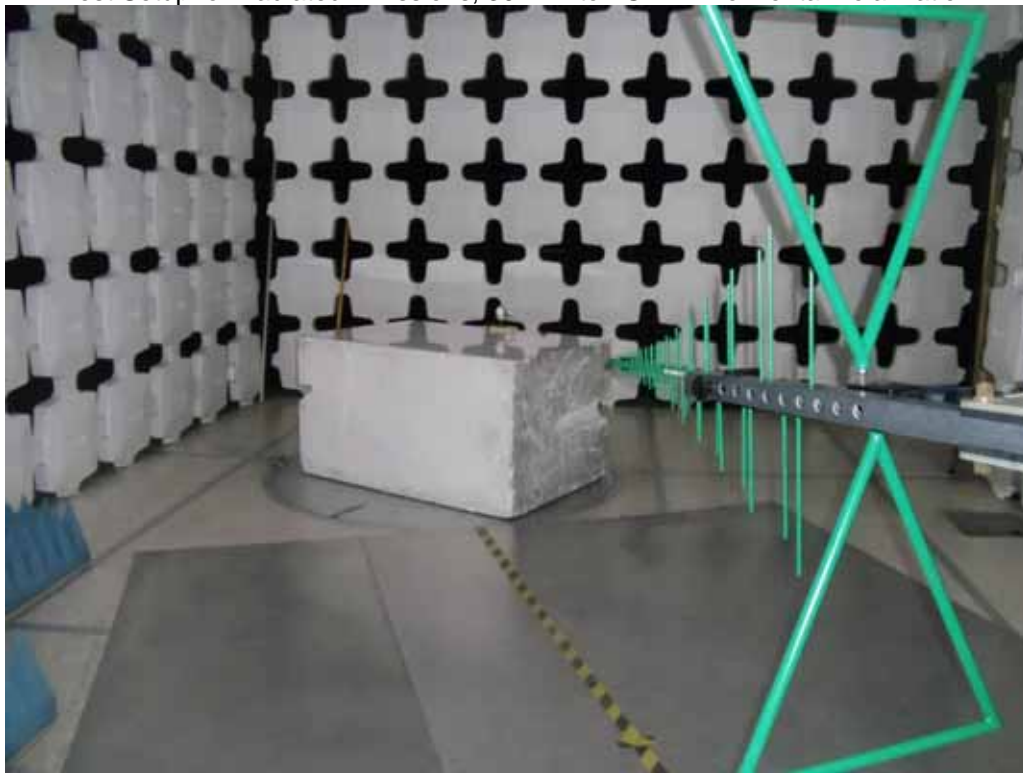


Test Setup for Conducted Emissions

Figure 3

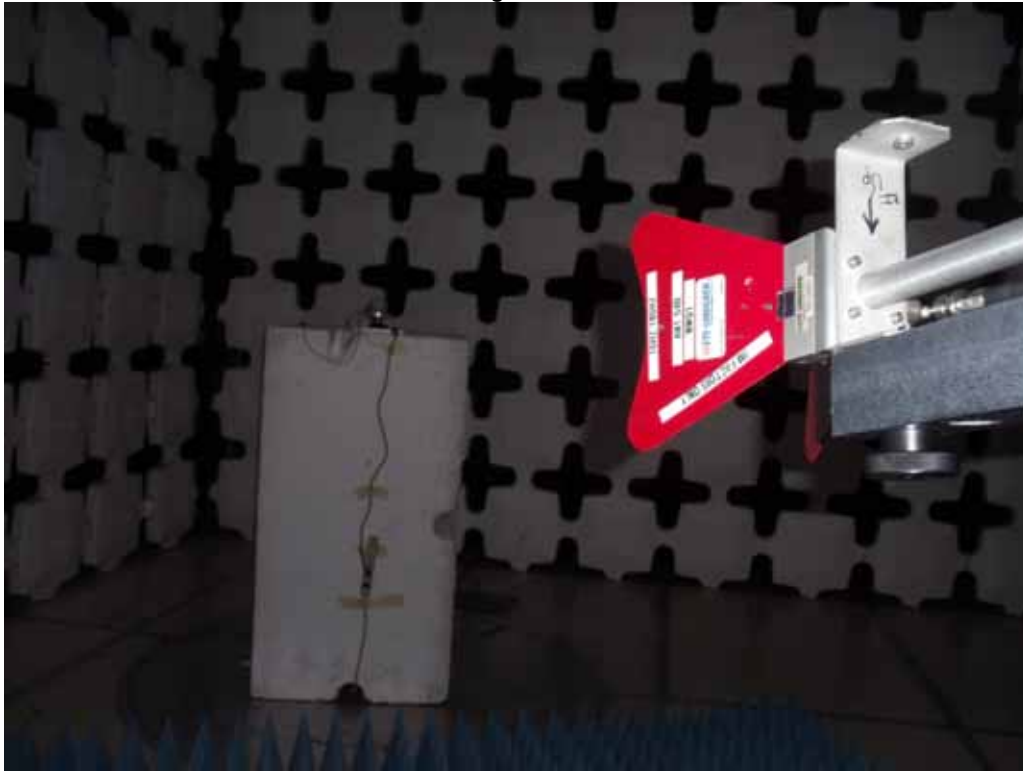


Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization



Test Setup for Radiated Emissions, 30MHz to 1GHz – Vertical Polarization

Figure 4



Test Setup for Radiated Emissions, Above 1GHz – Horizontal Polarization



Test Setup for Radiated Emissions, Above 1GHz – Vertical Polarization





## FCC Part 15 Subpart B Conducted Emissions Test

### Significant Emissions Data

VBR8 03/04/2015

Manufacturer : HEATH CO LLC.  
Model : NOTIFI  
DUT Mode : VIDEO STREAMING  
Line Tested : L1  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes : LIGHT ON  
Test Engineer : R. King  
Limit : Class B  
Test Date : Nov 03, 2015 11:59:13 AM  
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dBμV	Quasi-peak Limit dBμV	Excessive Quasi-peak Emissions	Average Level dBμV	Average Limit dBμV	Excessive Average Emissions
0.204	45.7	63.4		35.9	53.4	
0.495	39.3	56.1		33.2	46.1	
0.500	38.5	56.0		32.0	46.0	
0.984	32.1	56.0		26.3	46.0	
1.597	32.1	56.0		25.5	46.0	
2.975	31.8	56.0		25.3	46.0	
3.293	31.9	56.0		26.2	46.0	
8.758	34.8	60.0		28.7	50.0	
10.269	40.7	60.0		33.7	50.0	
17.240	38.6	60.0		28.3	50.0	

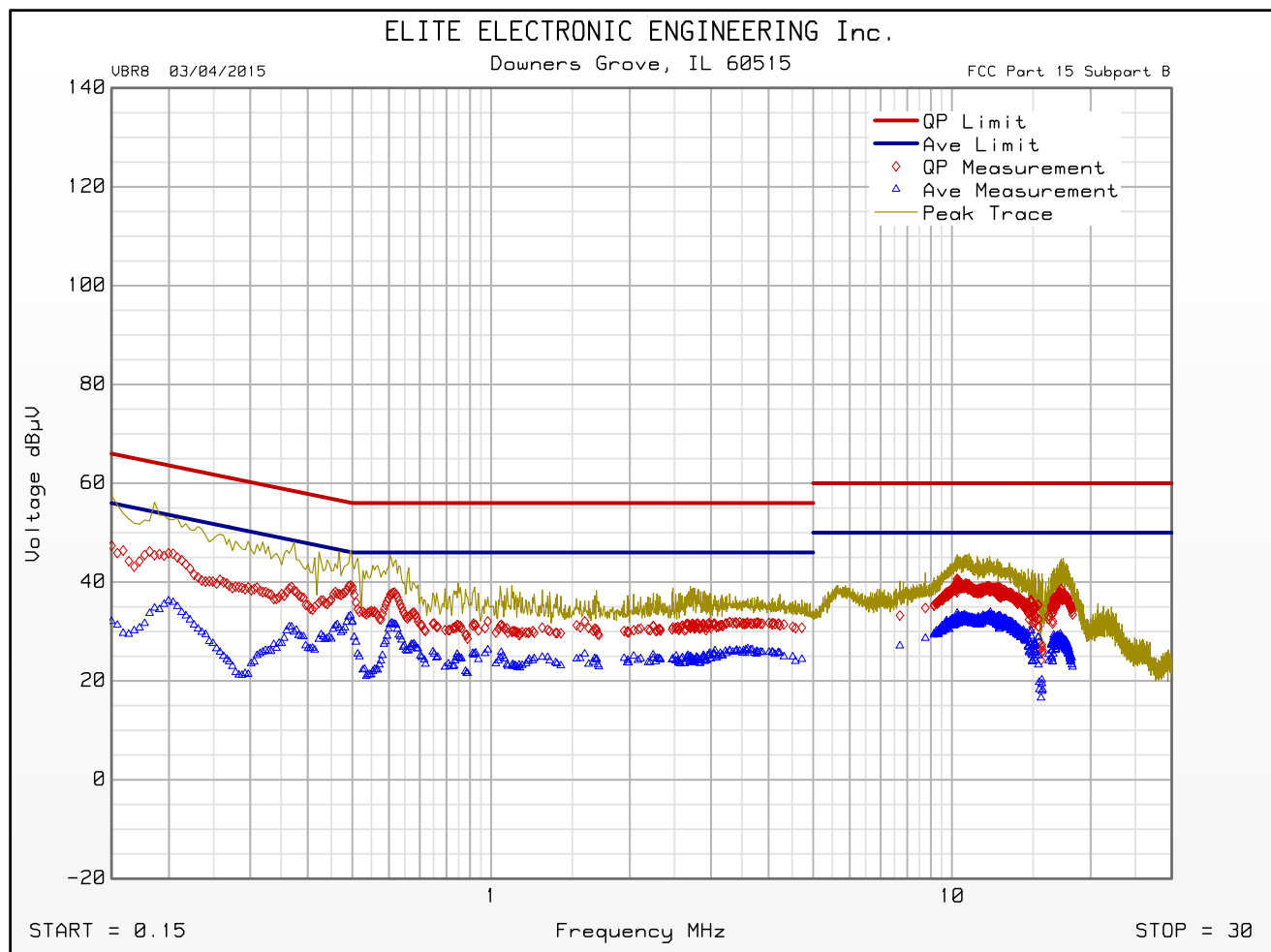


## FCC Part 15 Subpart B Conducted Emissions Test

### Cumulative Data

VBR8 03/04/2015

Manufacturer : HEATH CO LLC.  
Model : NOTIFI  
DUT Mode : VIDEO STREAMING  
Line Tested : L1  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes : LIGHT ON  
Test Engineer : R. King  
Limit : Class B  
Test Date : Nov 03, 2015 11:59:13 AM



Emissions Meet QP Limit  
Emissions Meet Ave Limit



## FCC Part 15 Subpart B Conducted Emissions Test

### Significant Emissions Data

VBR8 03/04/2015

Manufacturer : HEATH CO LLC.  
Model : NOTIFI  
DUT Mode : VIDEO STREAMING  
Line Tested : L2  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes : LIGHT ON  
Test Engineer : R. King  
Limit : Class B  
Test Date : Nov 03, 2015 12:17:29 PM  
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dB $\mu$ V	Quasi-peak Limit dB $\mu$ V	Excessive Quasi-peak Emissions	Average Level dB $\mu$ V	Average Limit dB $\mu$ V	Excessive Average Emissions
0.150	49.2	66.0		34.6	56.0	
0.495	36.7	56.1		28.0	46.1	
0.572	37.0	56.0		27.8	46.0	
1.114	30.1	56.0		22.2	46.0	
1.754	31.3	56.0		23.1	46.0	
2.939	33.6	56.0		25.4	46.0	
4.198	33.5	56.0		25.3	46.0	
5.779	32.6	60.0		26.5	50.0	
13.275	36.2	60.0		22.9	50.0	
16.772	37.2	60.0		21.9	50.0	

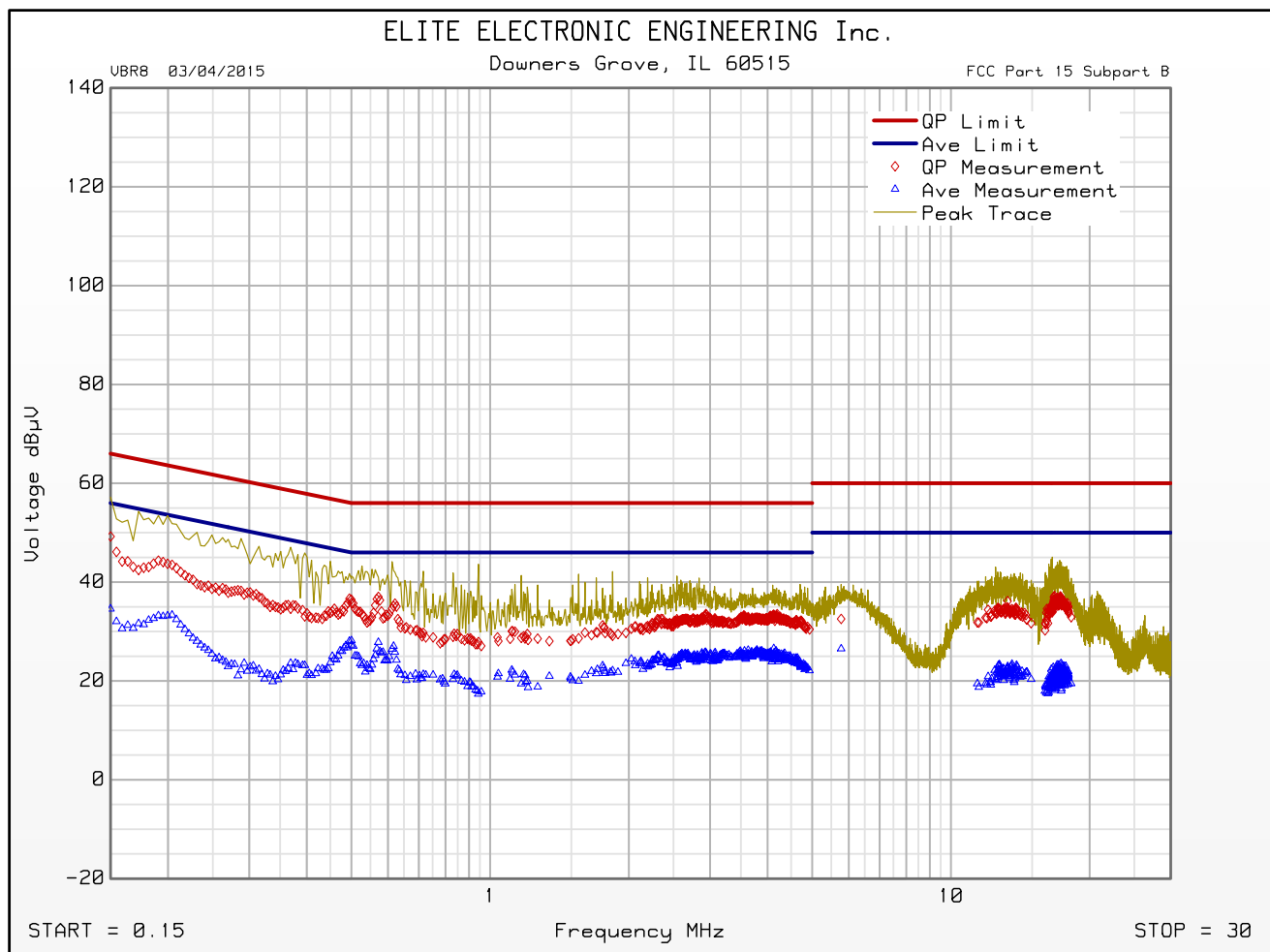


## FCC Part 15 Subpart B Conducted Emissions Test

### Cumulative Data

VBR8 03/04/2015

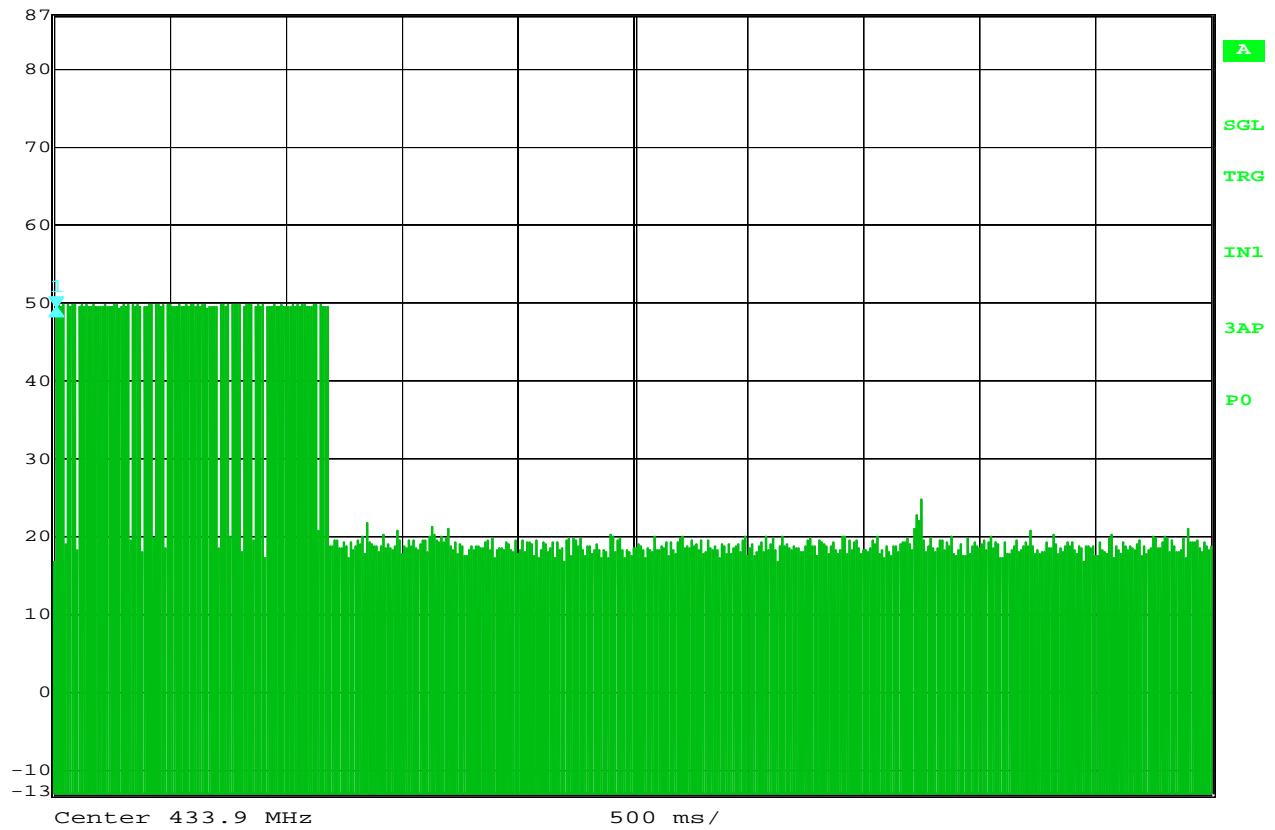
Manufacturer : HEATH CO LLC.  
Model : NOTIFI  
DUT Mode : VIDEO STREAMING  
Line Tested : L2  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes : LIGHT ON  
Test Engineer : R. King  
Limit : Class B  
Test Date : Nov 03, 2015 12:17:29 PM



Emissions Meet QP Limit  
Emissions Meet Ave Limit



Delta 1 [T3] RBW 1 MHz RF Att 0 dB  
Ref Lvl 0.00 dB VBW 10 MHz  
87 dBμV 360.721443 μs SWT 5 s Unit dBμV



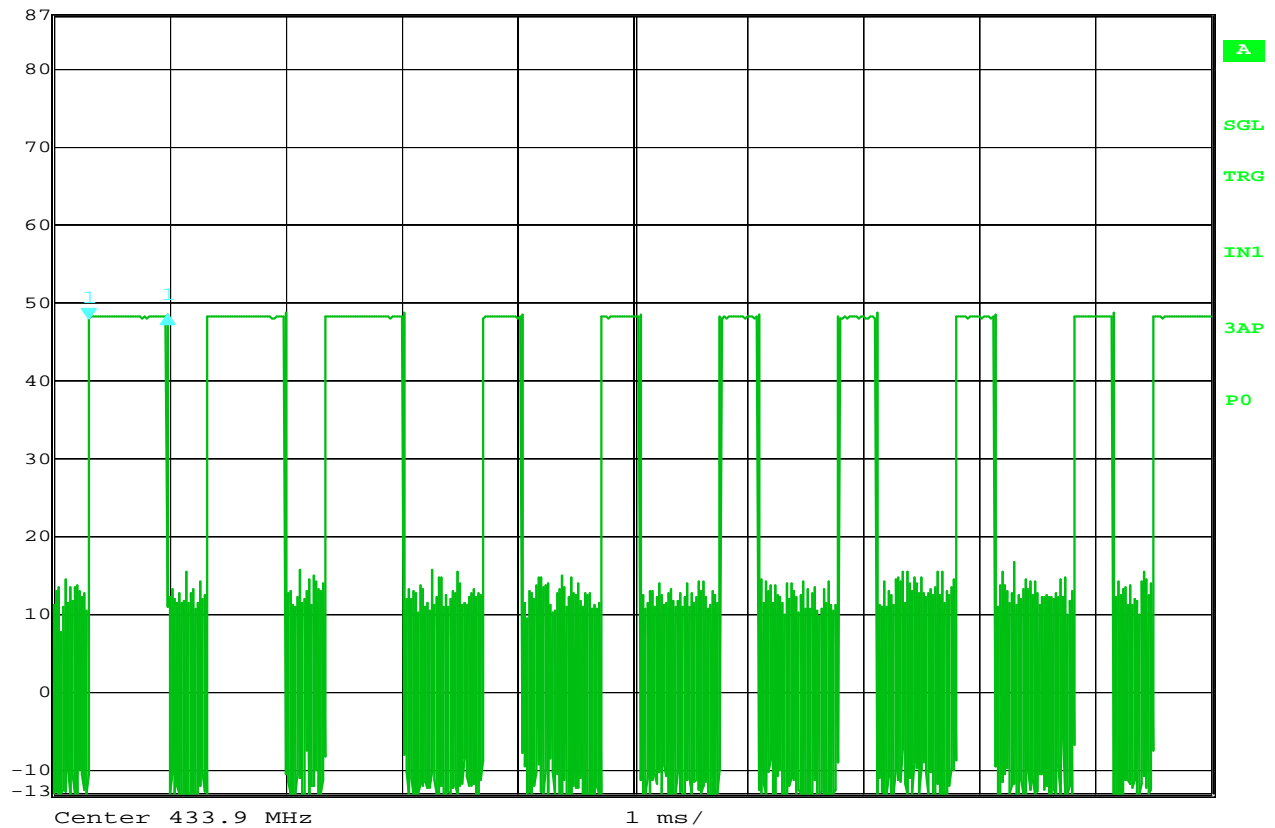
Date: 14.JAN.2016 11:32:13

#### FCC 15C 15.231 Periodic Transmission

MANUFACTURER : HeathCo LLC.  
MODEL NUMBER : NOTIFI  
TEST MODE : Tx 433.9MHz  
: PEAK detector  
NOTES : EUT shuts off within 5 seconds



Delta 1 [T3] RBW 1 MHz RF Att 0 dB  
Ref Lvl 0.48 dB VBW 10 MHz  
87 dBV 681.362725  $\mu$ s SWT 10 ms Unit dBV



Date: 14.JAN.2016 10:57:28

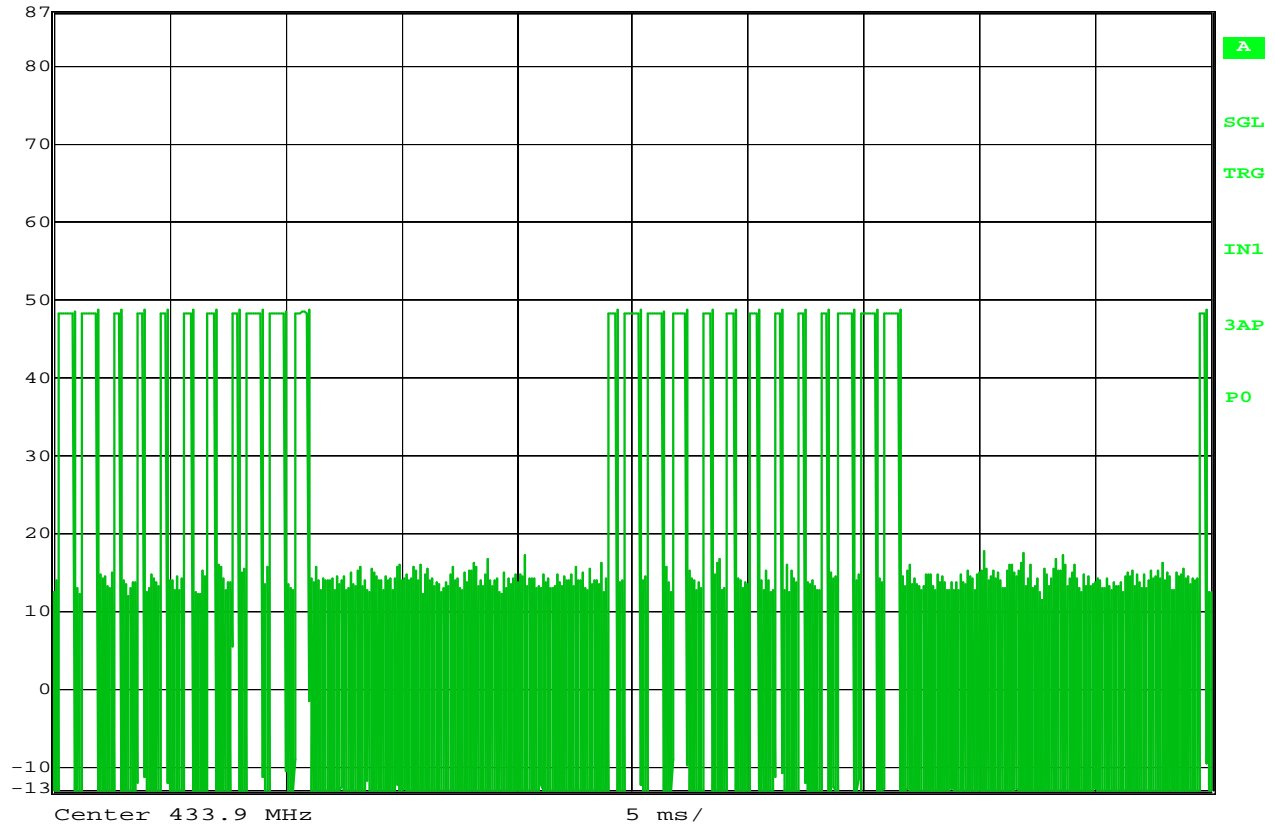
#### FCC 15C 15.231 / Duty Cycle

MANUFACTURER : HeathCo LLC.  
MODEL NUMBER : NOTIFI  
TEST MODE : Tx @ 433.9MHz  
: PEAK detector  
NOTES : Large bit 681.4uS  
NOTES :  
NOTES :



Ref Lvl  
87 dBμV

RBW 1 MHz RF Att 0 dB  
VBW 10 MHz  
SWT 50 ms Unit dBμV

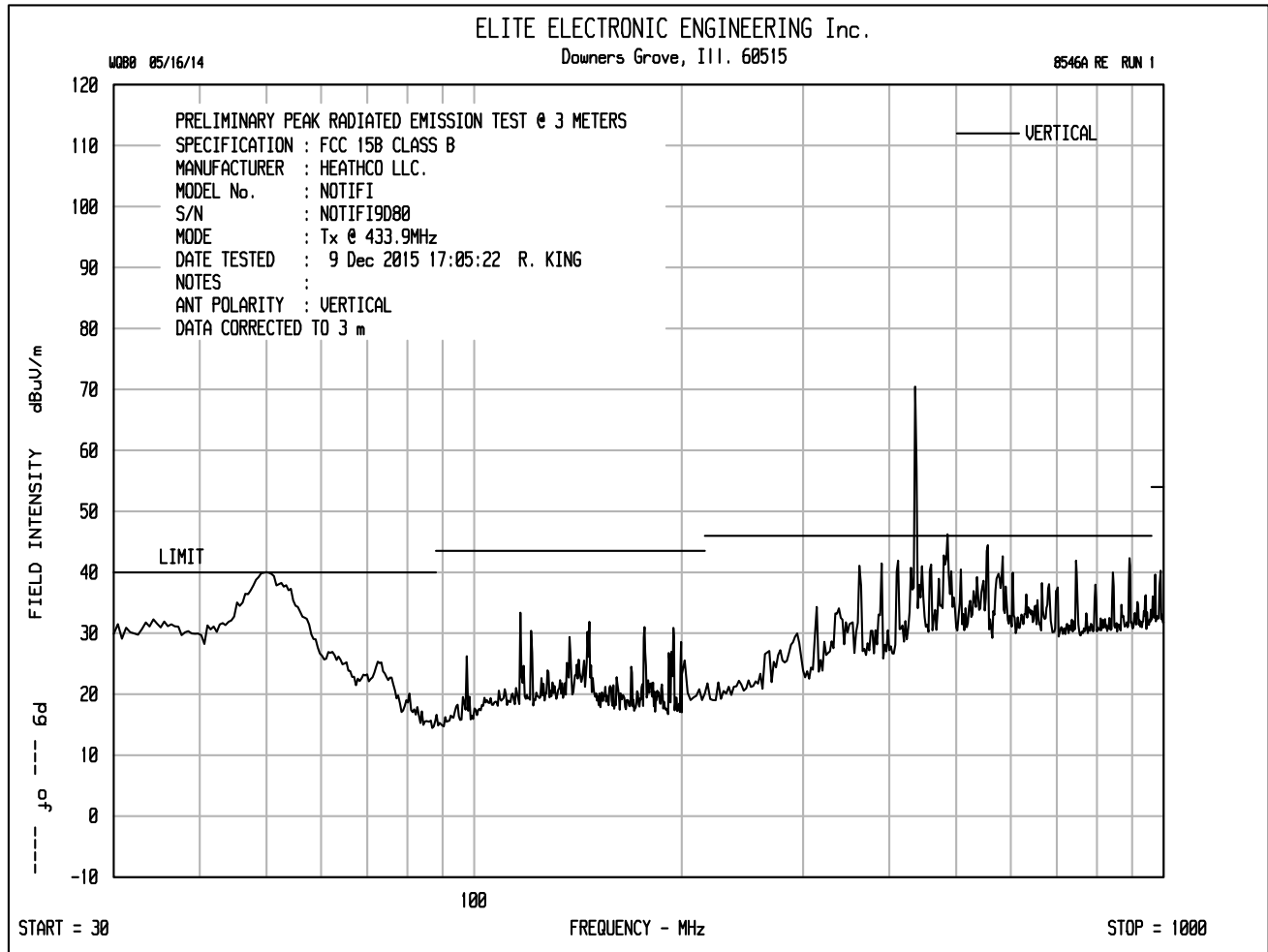


Date: 14.JAN.2016 10:40:30

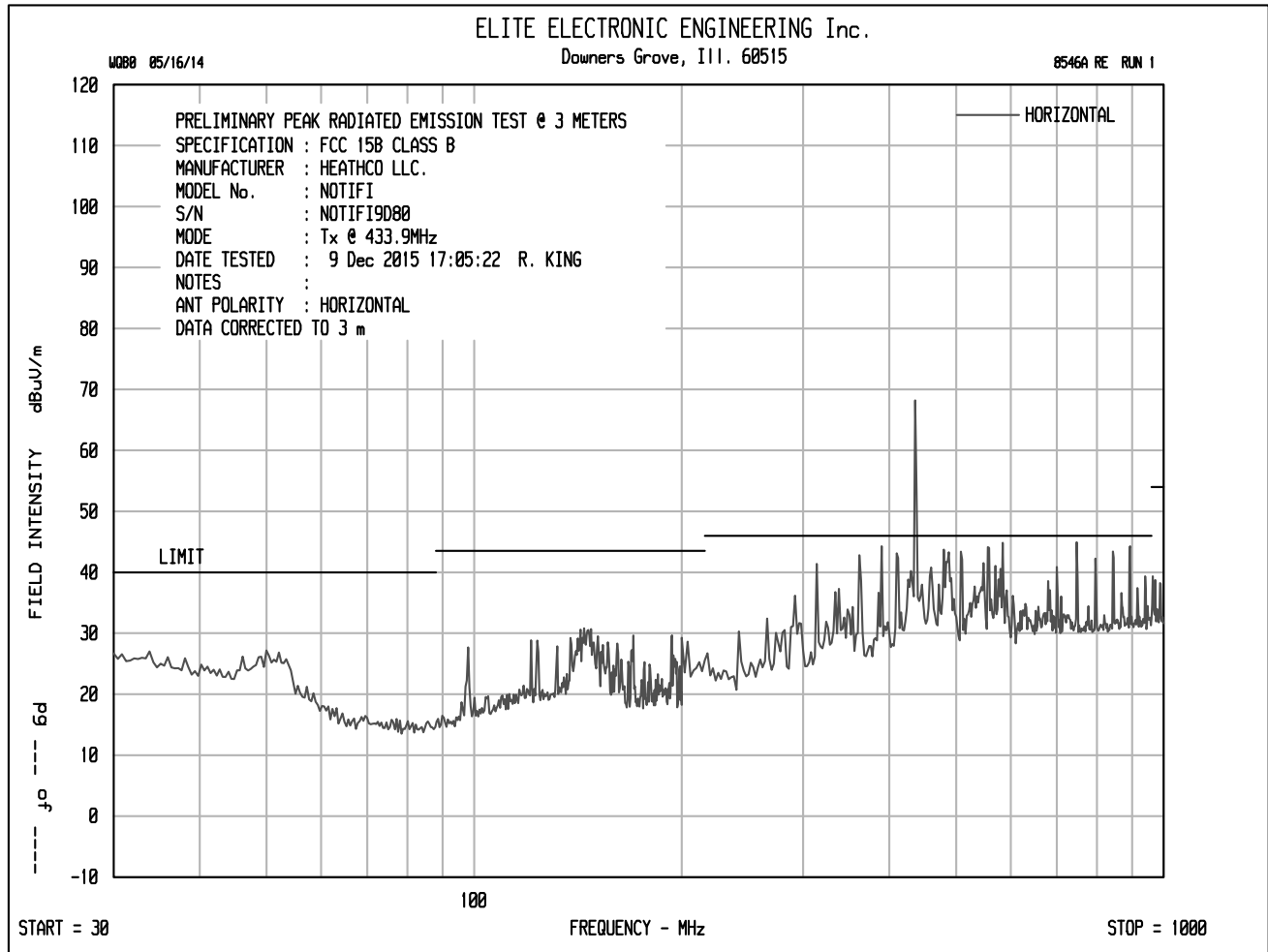
**FCC 15C 15.247 / OBW**

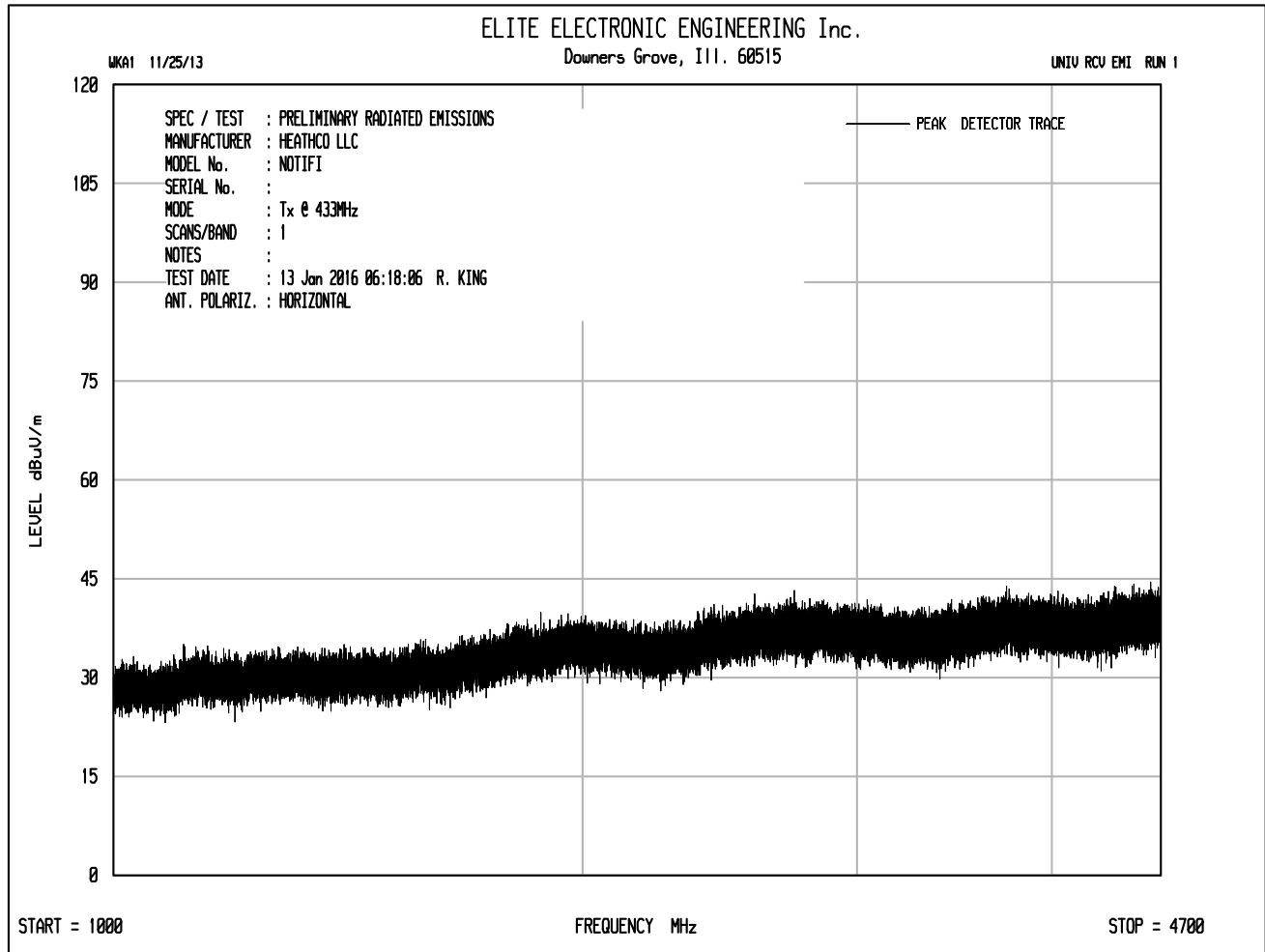
MANUFACTURER : HeathCo LLC.  
MODEL NUMBER : NOTIFI  
TEST MODE : Tx 433.9MHz  
: Word = 12.12mS

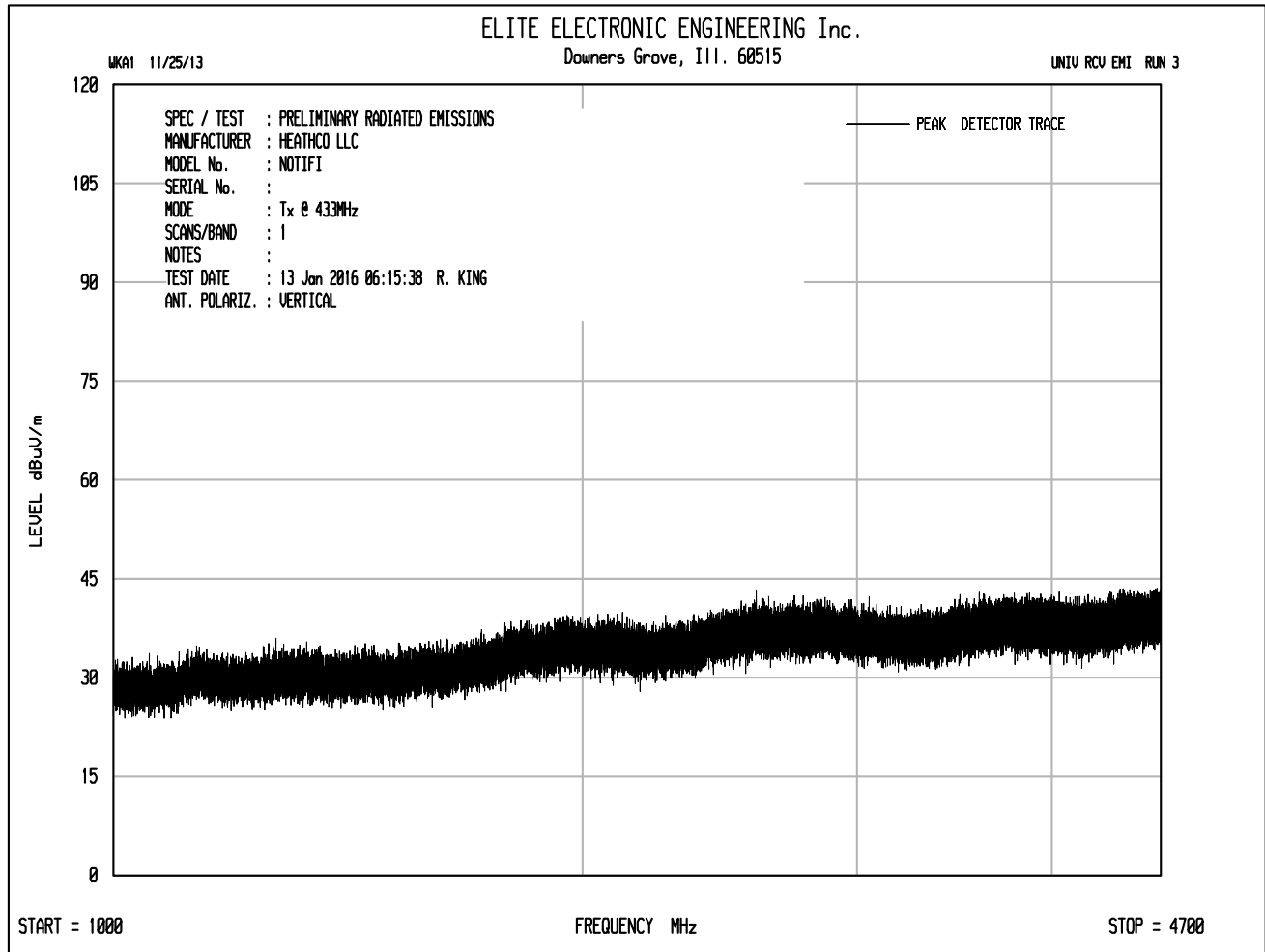
NOTES :













Manufacturer : HeathCo LLC  
Model No. : NOTIFI  
Specification : FCC-15.231 Spurious Radiated Emissions in Restricted Bands  
Date : November 18, 2015  
Mode : Tx 433.9MHz  
Notes : Test Distance is 3 meters  
Notes : Maximized Peak Readings

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total (dBuV/m)	Total (uV/m)	Limit (uV/m)	Margin (dB)
433.920	H	47.6		1.1	22.7	0.0	-10.9	60.5	1054.4	10996.7	-20.4
433.920	V	46.5		1.1	22.7	0.0	-10.9	59.4	936.5	10996.7	-21.4
867.840	H	17.9		1.5	26.7	0.0	-10.9	35.2	57.8	1099.7	-25.6
867.840	V	13.3	*	1.5	26.7	0.0	-10.9	30.7	34.1	1099.7	-30.2
1301.760	H	14.6	*	1.9	29.2	0.0	-10.9	34.9	55.5	500.0	-19.1
1301.760	V	17.6		1.9	29.2	0.0	-10.9	37.9	78.4	500.0	-16.1
1735.680	H	14.6	*	2.2	29.7	0.0	-10.9	35.7	60.9	1099.7	-25.1
1735.680	V	14.8	*	2.2	29.7	0.0	-10.9	35.8	61.8	1099.7	-25.0
2169.600	H	17.8		2.5	31.6	0.0	-10.9	40.9	110.9	1099.7	-19.9
2169.600	V	23.1		2.5	31.6	0.0	-10.9	46.2	203.9	1099.7	-14.6
2603.520	H	16.3	*	2.7	32.7	0.0	-10.9	40.9	110.5	1099.7	-20.0
2603.520	V	16.8		2.7	32.7	0.0	-10.9	41.4	117.0	1099.7	-19.5
3037.440	H	16.3		3.0	32.7	0.0	-10.9	41.1	114.1	1099.7	-19.7
3037.440	V	14.8	*	3.0	32.7	0.0	-10.9	39.6	95.4	1099.7	-21.2
3471.360	H	14.5	*	3.2	33.1	0.0	-10.9	39.9	98.6	1099.7	-20.9
3471.360	V	13.1	*	3.2	33.1	0.0	-10.9	38.4	83.4	1099.7	-22.4
3905.280	H	15.3		3.4	33.5	0.0	-10.9	41.3	116.4	500.0	-12.7
3905.280	V	16.1		3.4	33.5	0.0	-10.9	42.1	127.3	500.0	-11.9
4339.200	H	15.4		3.5	33.8	0.0	-10.9	41.9	124.3	500.0	-12.1
4339.200	V	14.5		3.5	33.8	0.0	-10.9	41.0	111.8	500.0	-13.0

Total (dBuV/m) = Meter Reading (dBuV) + Cable Factor (dB) + Antenna Factor (dB) + Pre Amp Gain (dB) + duty cycle

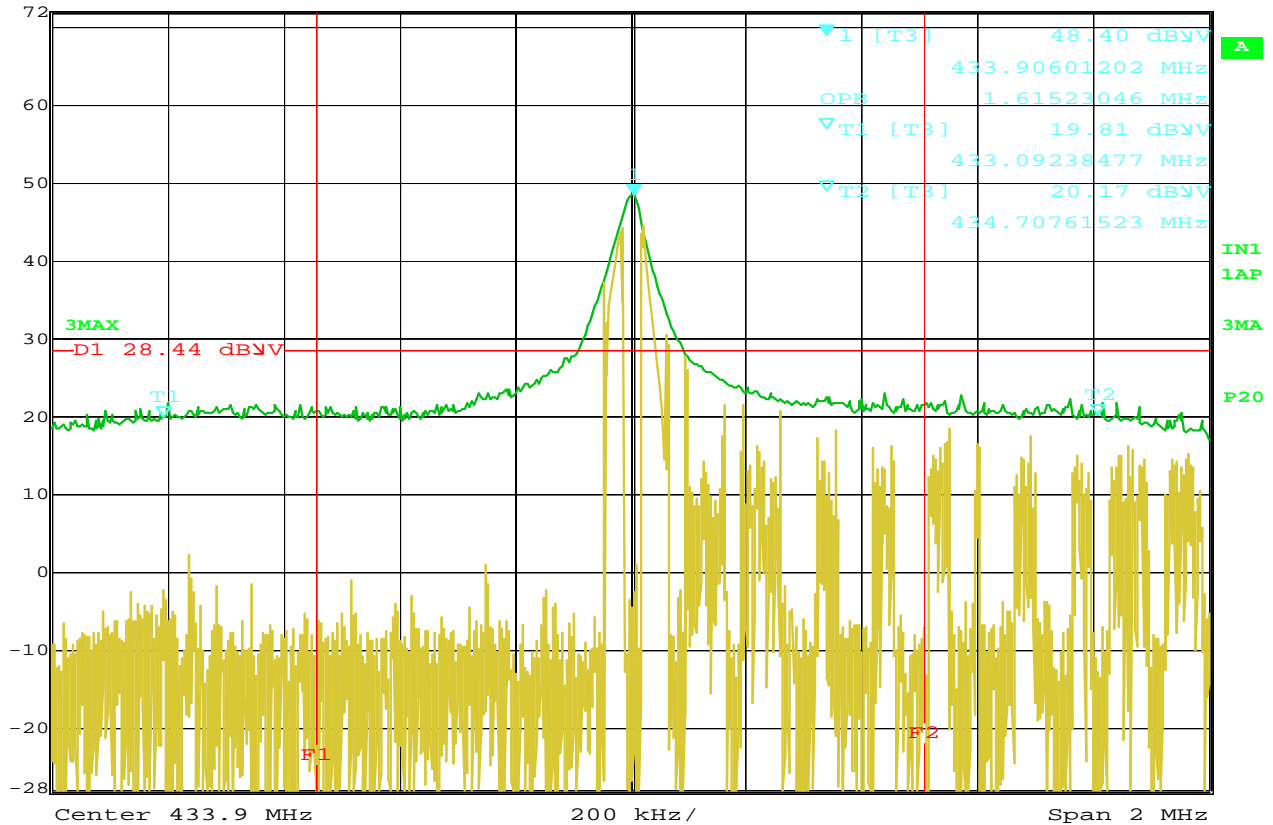
Total uV/m =  $10^{((\text{Peak Total (dBuV/m)})/20)}$

Checked BY RICHARD E. King :

Richard E. King



Marker 1 [T3] RBW 30 kHz RF Att 0 dB  
Ref Lvl 48.40 dBμV VBW 300 kHz  
72 dBμV 433.90601202 MHz SWT 6 ms Unit dBμV



Date: 27.OCT.2015 10:14:19

### FCC 15C 15.231 / Occupied Bandwidth

MANUFACTURER : HeathCO LLC.  
MODEL NUMBER : Notifi  
SERIAL NUMBER : 9D80  
TEST MODE : Tx @ 433.9MHz  
TEST PARAMETERS : 0.25% of the center frequency  
:  $433.9\text{MHz} \times 0.0025 = 1.08475\text{MHz}$  (0.25% of center freq)  
:  $1.08475\text{MHz} / 2 = 542.375\text{kHz}$  (determines the bandedges)  
EQUIPMENT USED : RBA0, NTA3  
NOTES : Display Line L1 equals the 20dBc Limit.  
: Display Line F1 equals the lower bandedge  
: at  $((433.9\text{MHz} - 542.375\text{kHz}) = 433.357625\text{MHz}$   
: Display Line F2 equals the upper bandedge  
: at  $((433.9\text{MHz} + 542.375\text{kHz}) = 434.442375\text{MHz}$

NOTES