Measurement of RF Emissions from a WLTX-301-A Chime Transmitter

For	HeathCo LLC 2445 Nashville Rd Bowling Green, KY 42102-9045
P.O. Number	M001787
Date Tested	January 16 & 17, 2018
Test Personnel	Tylar Jozefczyk
Test Specification	FCC "Code of Federal Regulations" Title 47 Part15, Subpart C Industry Canada RSS-GEN Industry Canada RSS-210

Test Report By:

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Requested By: Jeff Bessinger
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Engineer of Illinois - 44894

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REVISION HISTORY

Revision	Date	Description
—	25 January 2018	Initial release
A	01 February 2018 By TMJ	Updated model number from WLTX-201-A to WLTX-301-A

Measurement of RF Emissions from a Chime Transmitter, Model No. WLTX-301-A

1. Introduction

1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on a Chime Transmitter, Model No. WLTX-301-A, (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was designed to transmit at approximately 315MHz using an internal antenna. The EUT was manufactured and submitted for testing by HeathCo LLC located in Bowling Green, KY.

1.2. Purpose

The test series was performed to determine if the EUT meets the radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.231 for Intentional Radiators.

The test series was also performed to determine if the EUT meets the radiated RF emission requirements of the Industry Canada Radio Standards Specification RSS-Gen Section 8 and RSS-210 Annex A, for transmitters.

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 22.5^{o}C and the relative humidity was 17%.

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, dated 1 October 2017
- 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"
- Industry Canada Radio Standards Specification, RSS-Gen, “General Requirements for Compliance of Radio Apparatus”, Issue 4, November 2014
- Industry Canada Radio Standards Specification, RSS-210, “License-Exempt Radio Apparatus: Category I Equipment”, Issue 9, August 2016

3. EUT Setup and Operation

3.1. General Description

The EUT is a HeathCo LLC, Chime Transmitter, Model No. WLTX-301-A. A block diagram of the EUT setup is shown as Figure 1.

3.1.1. Power Input

The EUT obtained 3VDC power from a button cell battery.

3.1.2. Grounding

The EUT was ungrounded during the tests.

3.2. Operational Mode

For all tests, the EUT was placed on an 80cm high non-conductive stand and was energized.

Tx – The EUT was powered and the transmit button was held down, setting the device to transmit continuously at 315MHz.

3.3. EUT Modifications

No modifications were required for compliance to FCC Part 15, Subpart C, Section 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 not greater than two 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.

Values of Expanded Measurement Uncertainty (95% Confidence) are presented below:

Measurement Type	Expanded Measurement Uncertainty
Conducted disturbance (mains port) (150 kHz – 30 MHz)	2.7
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2

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 15. 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 100msec 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).

5.3.2. Results

The plot of the duty cycle is shown on data pages 16 through 19. The duty cycle factor was computed from the following:

Duration of one cycle is (6 × 0.342ms) + (7 × 0.648ms) = 6.588ms

Period = 21.35ms

Duty Cycle = 20log(6.588ms/21.35ms) = -10.2dB.

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

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

[1] - Linear Interpolation

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 4.5GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity. * Replace with the proper frequency range.

The final open field emission tests were then manually performed over the frequency range of 30MHz to 4500MHz. 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.

5.4.3. Results

The preliminary plots, with the EUT transmitting at 315MHz, are presented on data pages 20 through 35. 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 315MHz, are presented on data page 36. As can be seen from the data, all emissions measured from the EUT were within the specification limits. The emissions level closet to the limit (worst case) occurred at 315MHz. The emissions level at this frequency was 5dB within the limit. Photographs of the test configuration which yielded the highest (or worst case) radiated emission levels are shown as Figures 2 and 3.

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 frequency spectrum near the fundamental was plotted. The 99% bandwidth was measured to be 633.36kHz.

5.5.3. Results

The plot of the emissions near the fundamental frequency is presented on data pages 37 and 38. 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 Chime Transmitter, Model No. WLTX-301-A did fully meet the radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.231 for Intentional Radiators, when tested per ANSI C63.4-2014.

It was also determined that the HeathCo LLC Chime Transmitter, Model No. WLTX-301-A did fully meet the radiated RF emission requirements of the Industry Canada Radio Standards Specification RSS-Gen Section 7.2.4 and RSS-210 Annex A, for transmitters, 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 NVLAP, 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
CDY0	WORKSTATION	ELITE	WORKSTATION		WINDOWS 7	N/A	
NTA4	BILOG ANTENNA	TESEQ	6112D	46660	20-2000GHZ	8/18/2017	8/18/2018
NWQ1	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	66655	1GHZ-18GHZ	4/4/2016	4/4/2018
PHA0	MAGNETIC FIELD PROBE	ELECTRO-METRICS	EM-6882	134	22-230MHZ	NOTE 1	
RBG3	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101592	2HZ-44GHZ	1/11/2017	2/11/2018
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	

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.

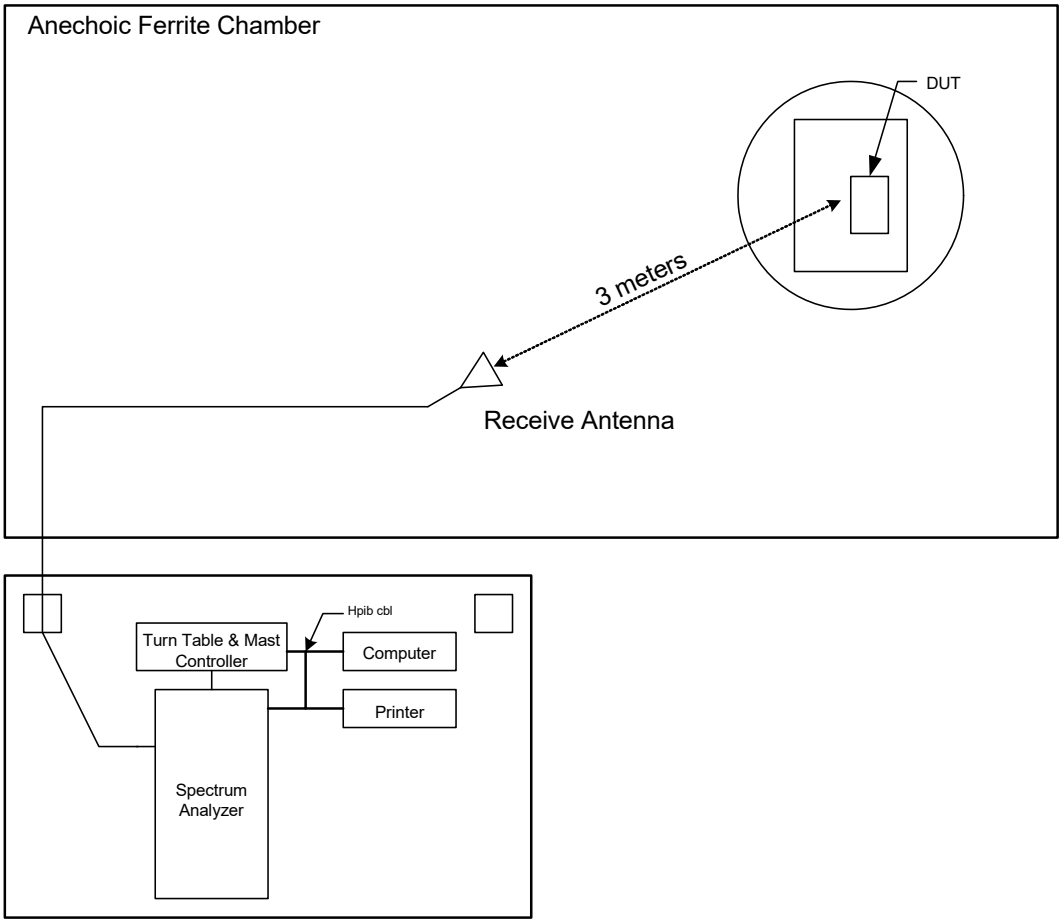


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

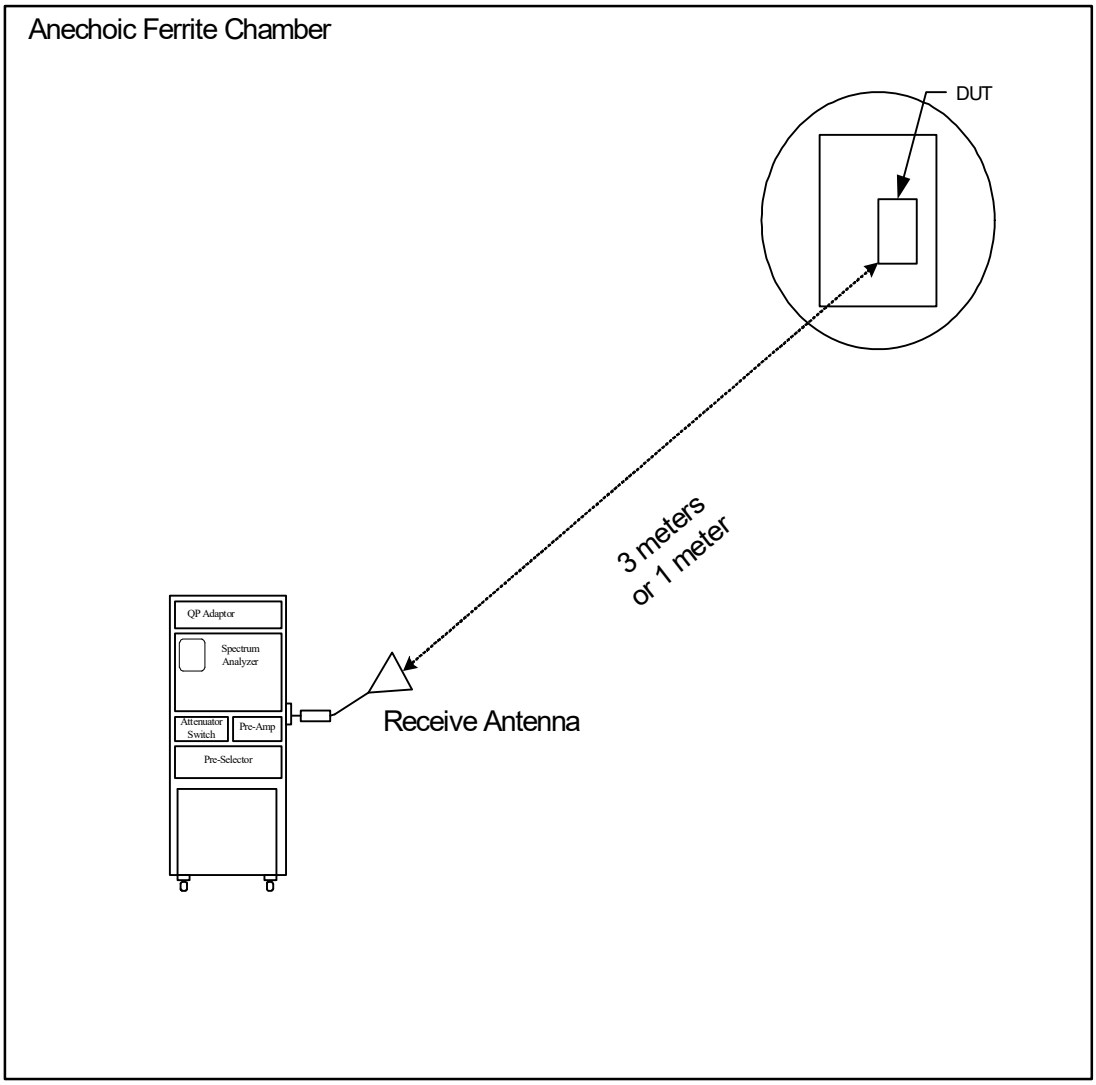
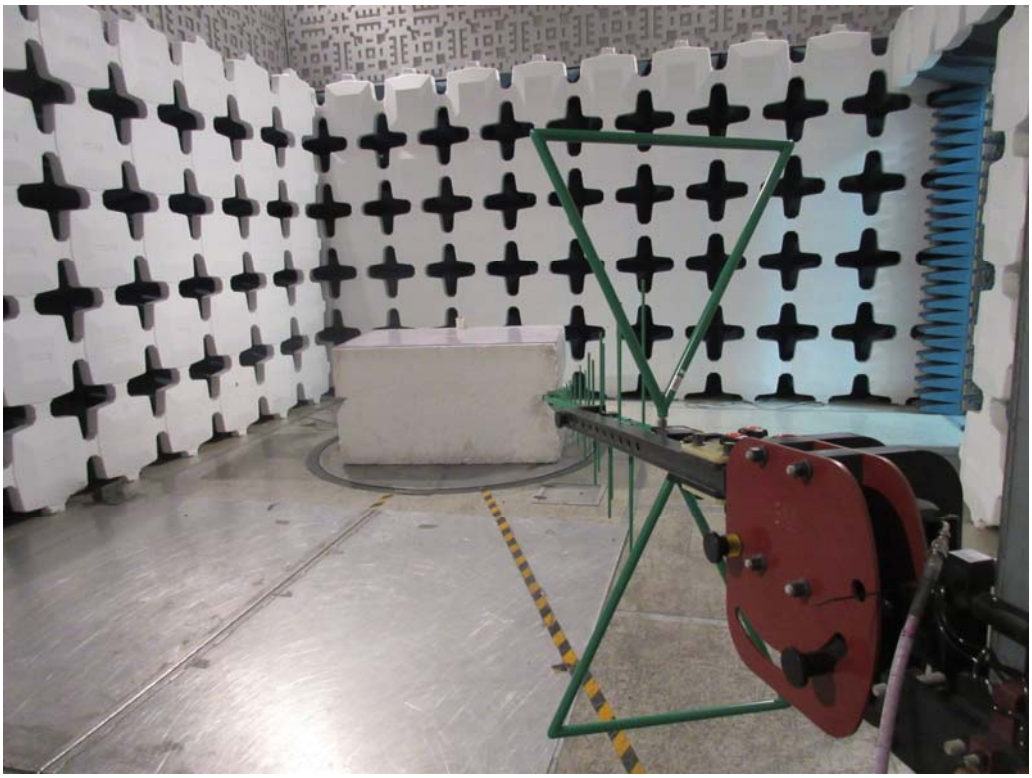

Anechoic Ferrite Chamber
DUT
3 meters
or 1 meter
QP Adaptor
Spectrum
Analyzer
Attenuator
Switch
Pre-Amp
Pre-Selector
Receive Antenna

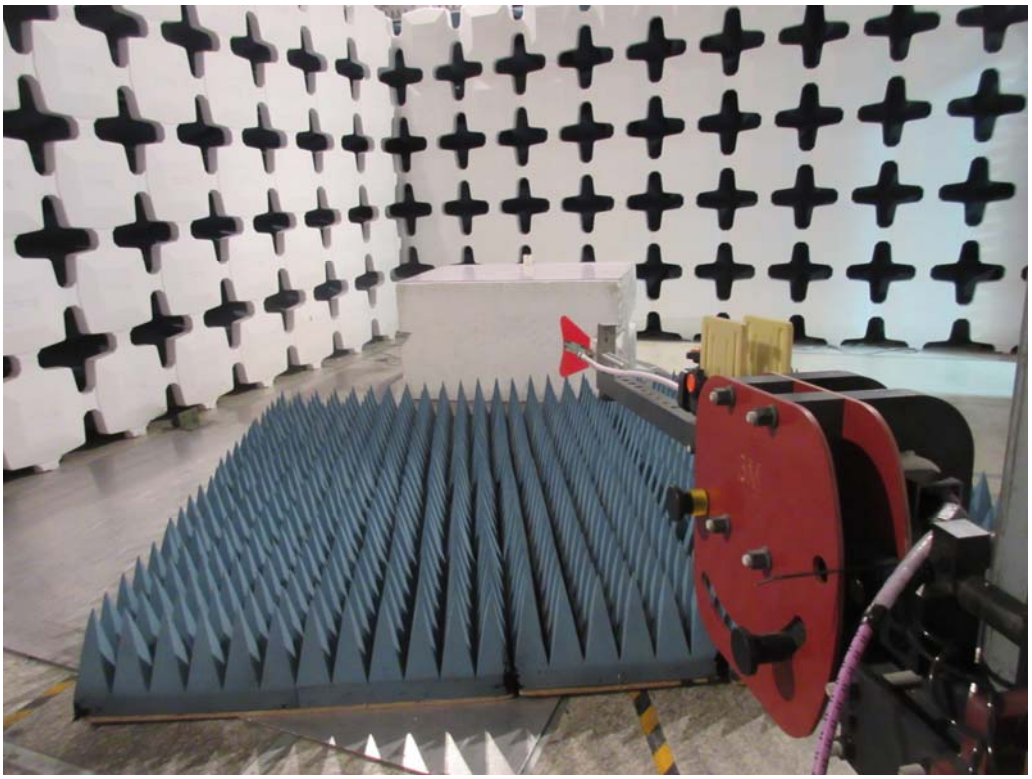
Figure 2

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

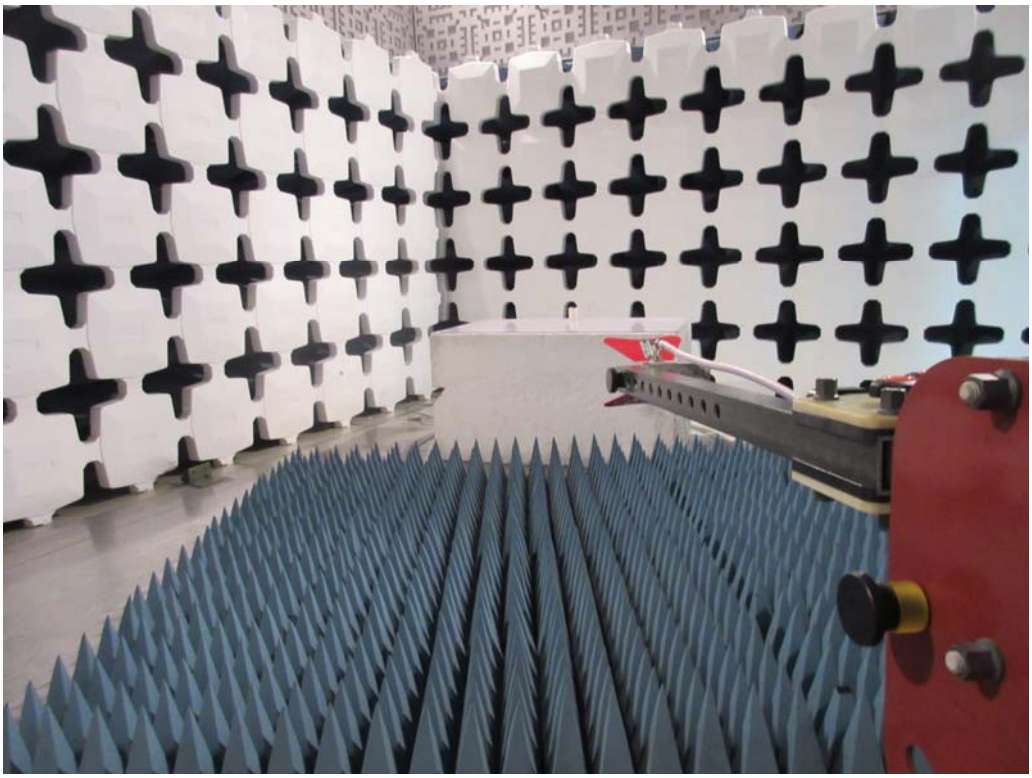


Test Setup for Radiated Emissions, 30MHz to 1GHz – Vertical Polarization

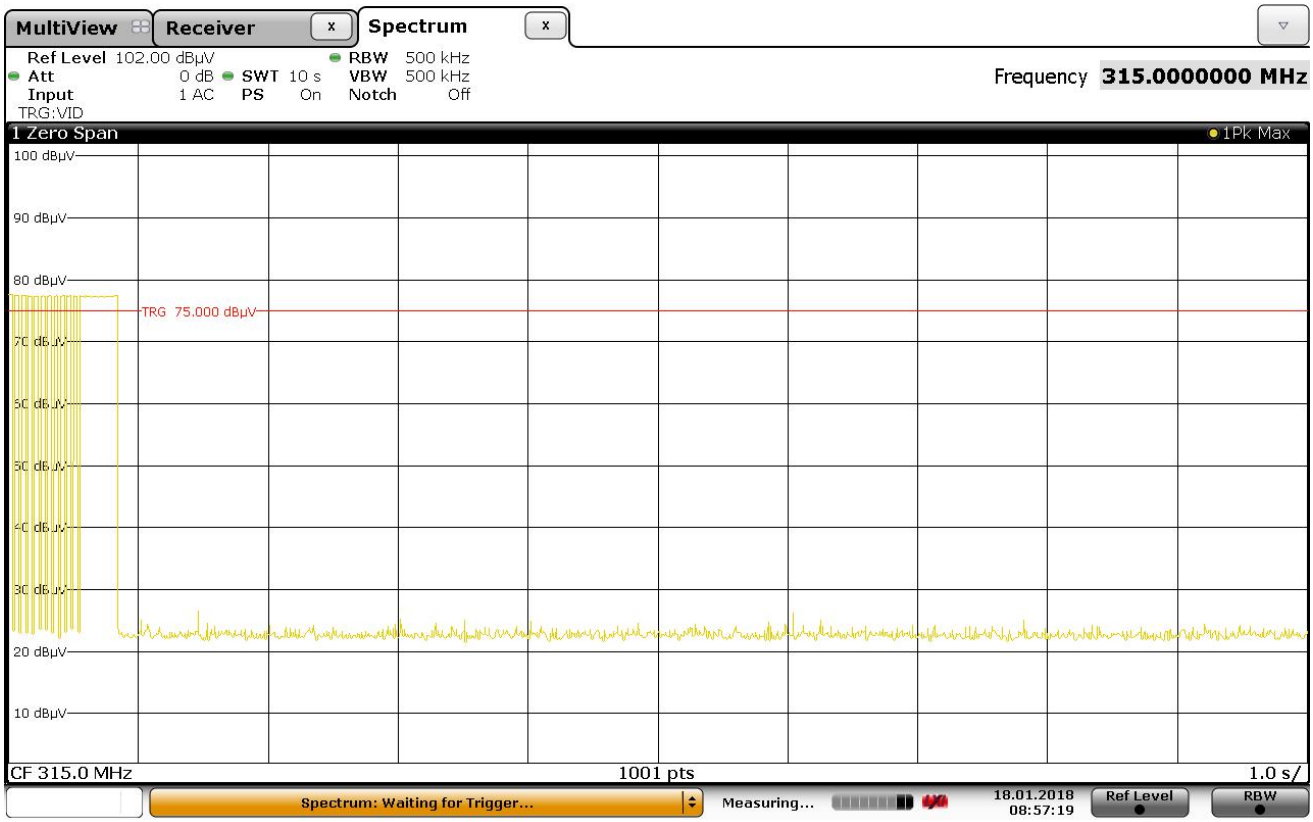
Figure 3



Test Setup for Radiated Emissions, 1 to 4.5GHz – Horizontal Polarization



Test Setup for Radiated Emissions, 1 to 4.5GHz – Vertical Polarization

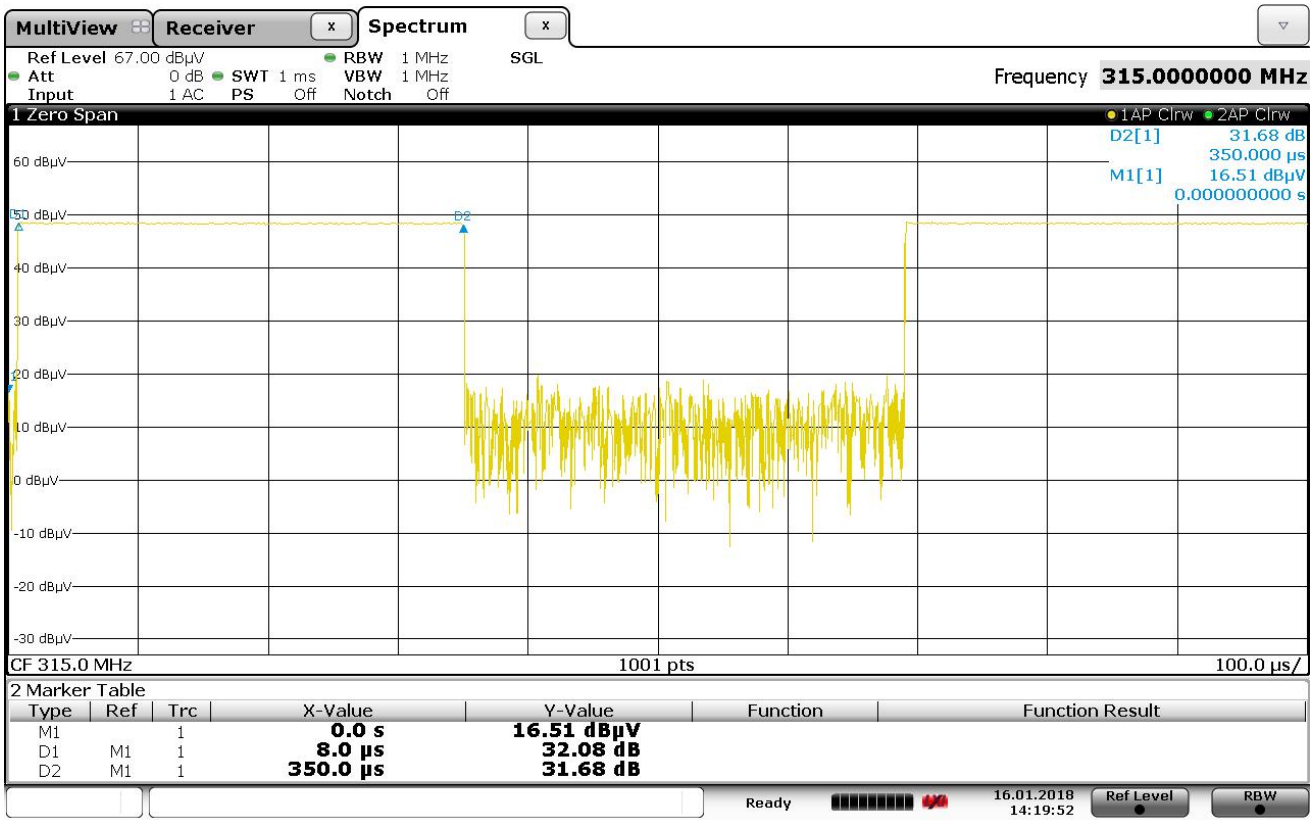


Date: 18.JAN.2018 08:57:19

PERIODIC OPERATION MEASUREMENT

MANUFACTURER : HeathCo LLC
TEST ITEM : Chime Transmitter
MODEL NUMBER : WLTX-301-A
TEST MODE : Tx – 315MHz

NOTES – The EUT ceased transmission within 1 second after activation.

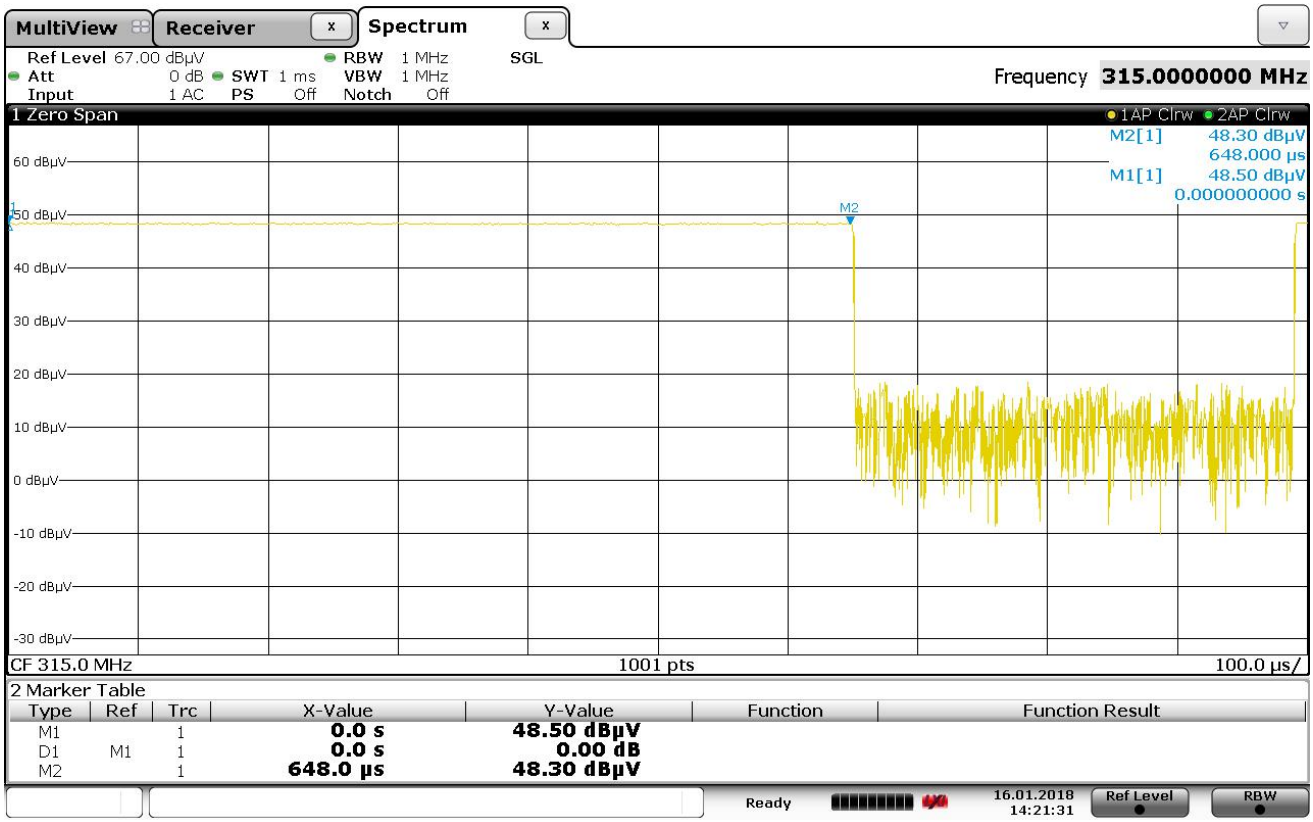


Date: 16.JAN.2018 14:19:52

DUTY CYCLE – NARROW PULSE

MANUFACTURER : HeathCo LLC
TEST ITEM : Chime Transmitter
MODEL NUMBER : WLTX-301-A
TEST MODE : Tx – 315MHz

NOTES – The time of the narrow pulse is 350.0µs - 8µs = 342µs = 0.342ms.

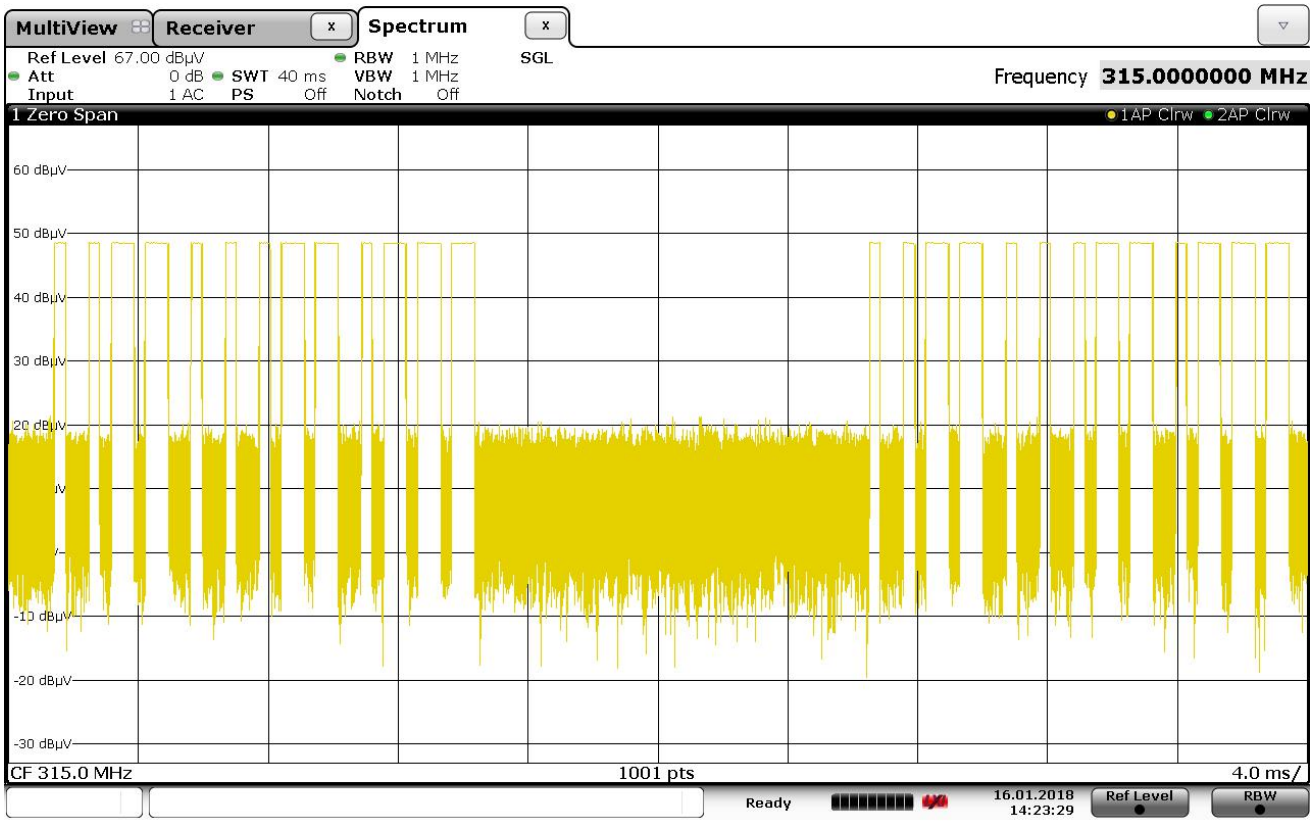


Date: 16.JAN.2018 14:21:31

DUTY CYCLE – WIDE PULSE

MANUFACTURER : HeathCo LLC
TEST ITEM : Chime Transmitter
MODEL NUMBER : WLTX-301-A
TEST MODE : Tx – 315MHz

NOTES – The time of the wide pulse is 648µs = 0.648ms.

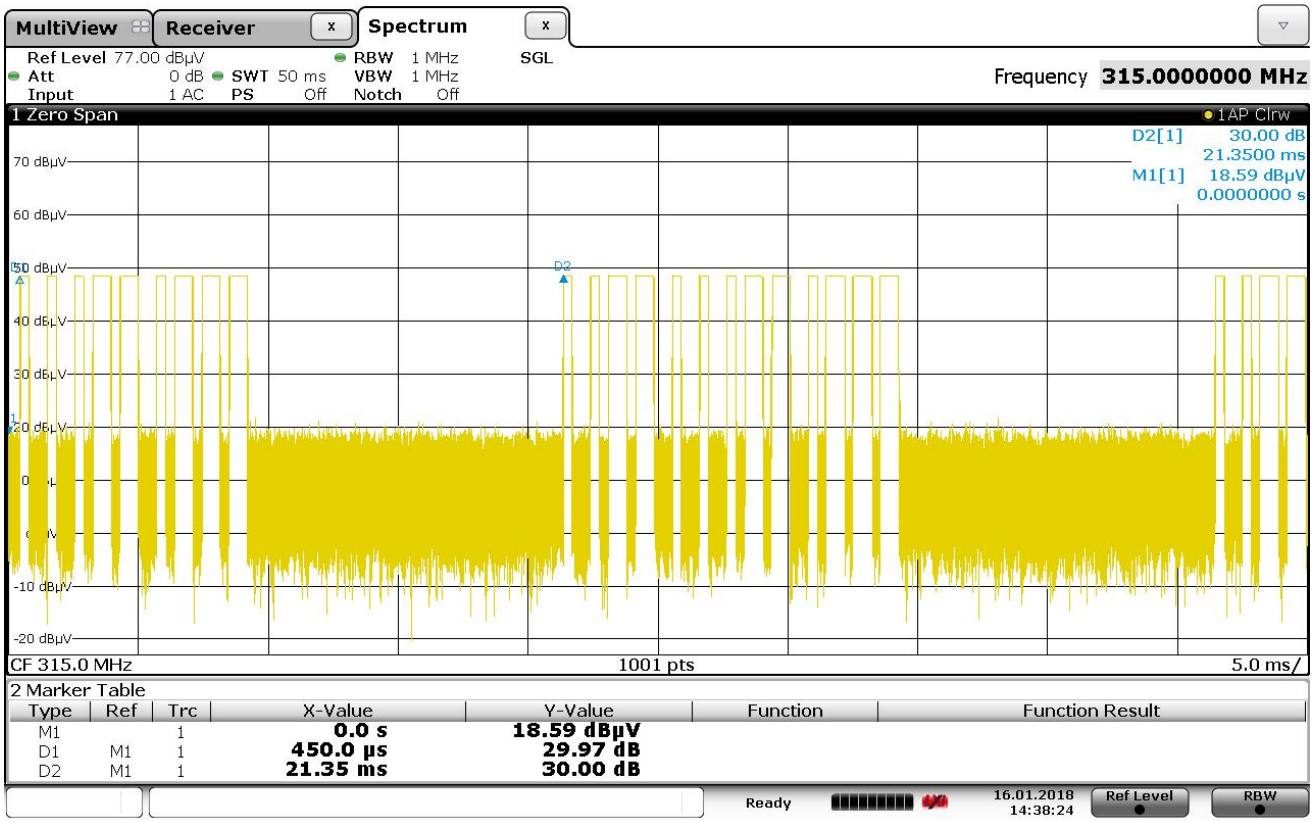


Date: 16.JAN.2018 14:23:29

DUTY CYCLE – NUMBER OF PULSES

MANUFACTURER : HeathCo LLC
TEST ITEM : Chime Transmitter
MODEL NUMBER : WLTX-301-A
TEST MODE : Tx – 315MHz

NOTES – The number of pulses counted was 6 narrow pulses and 7 wide pulses.

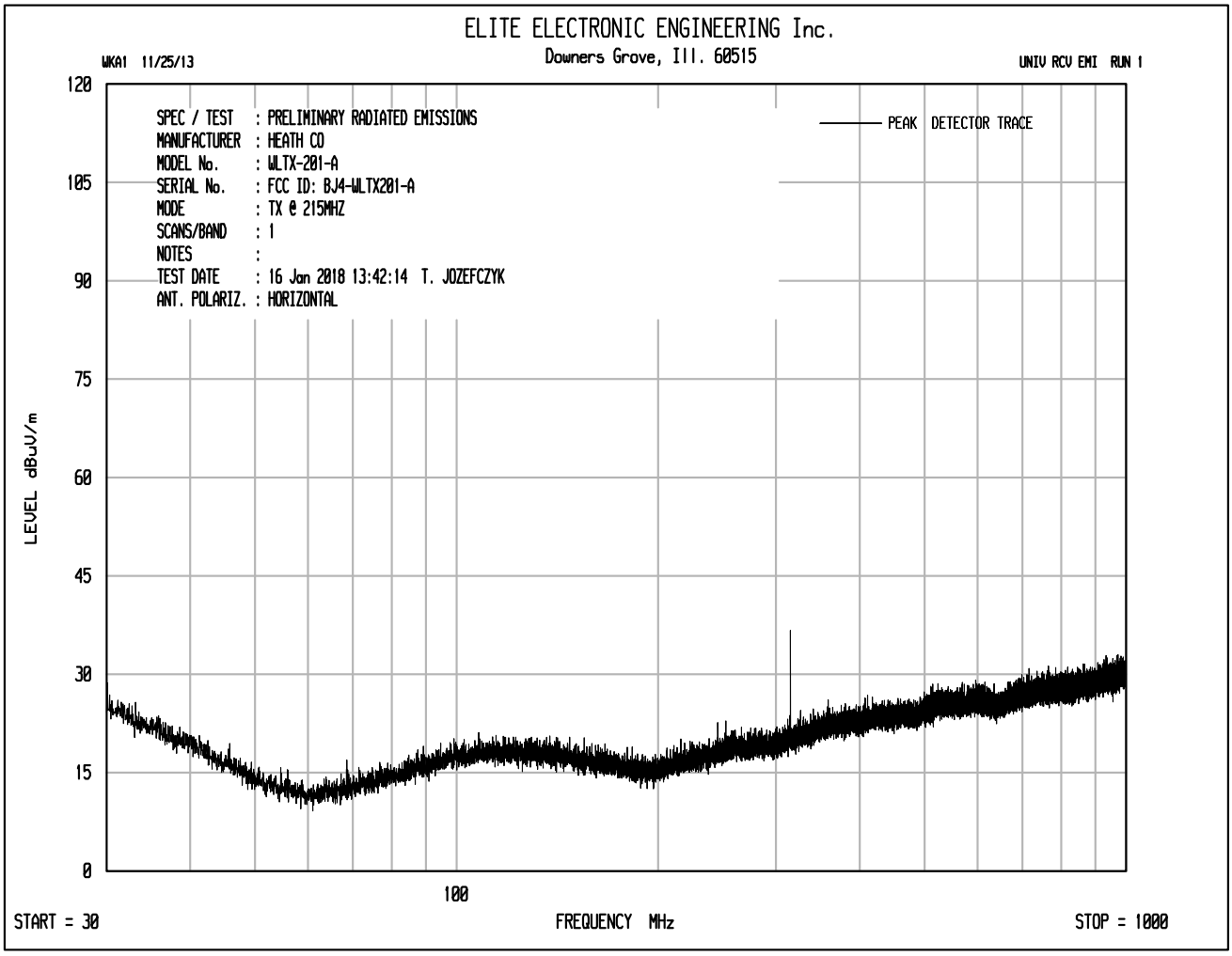


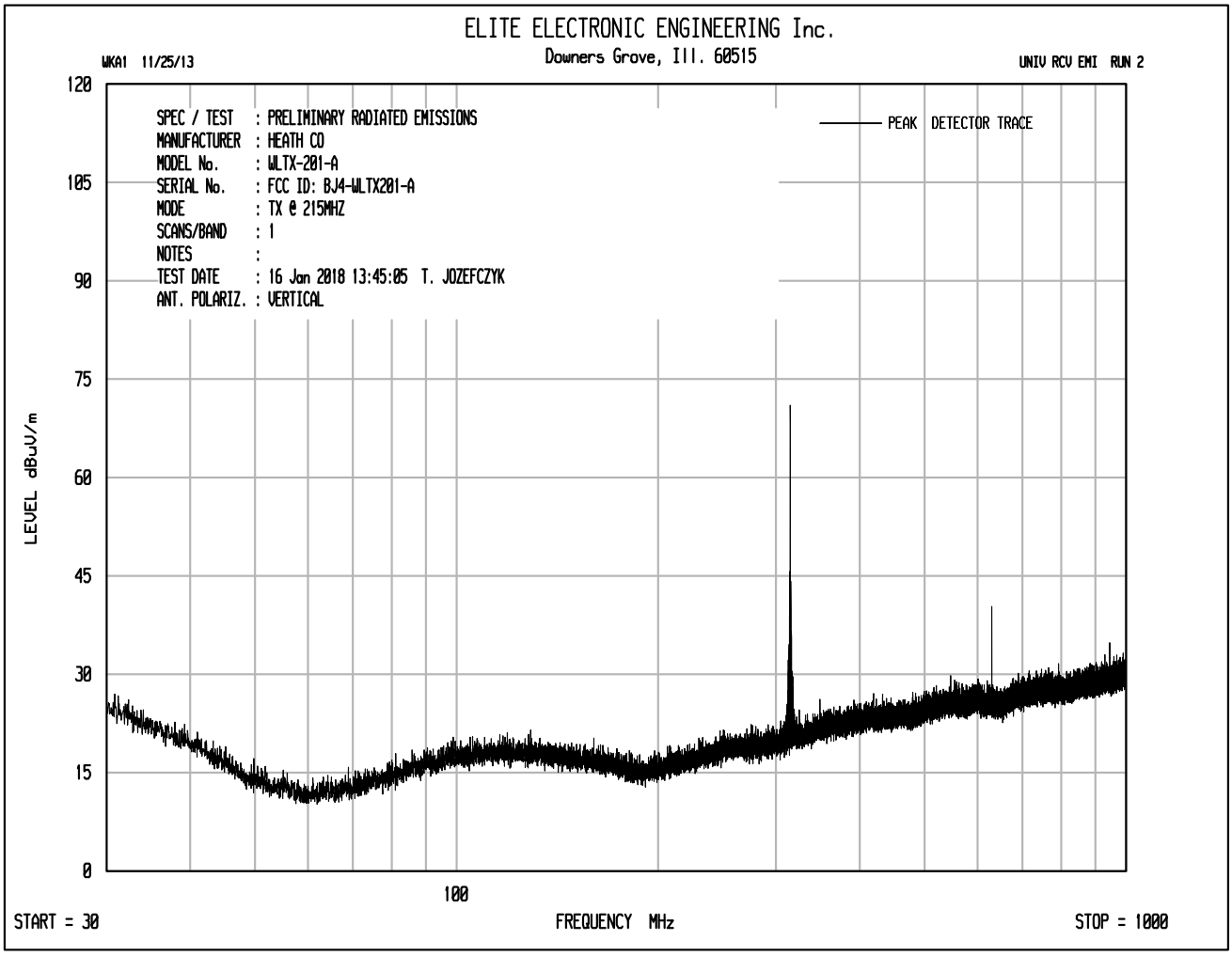
Date: 16.JAN.2018 14:38:24

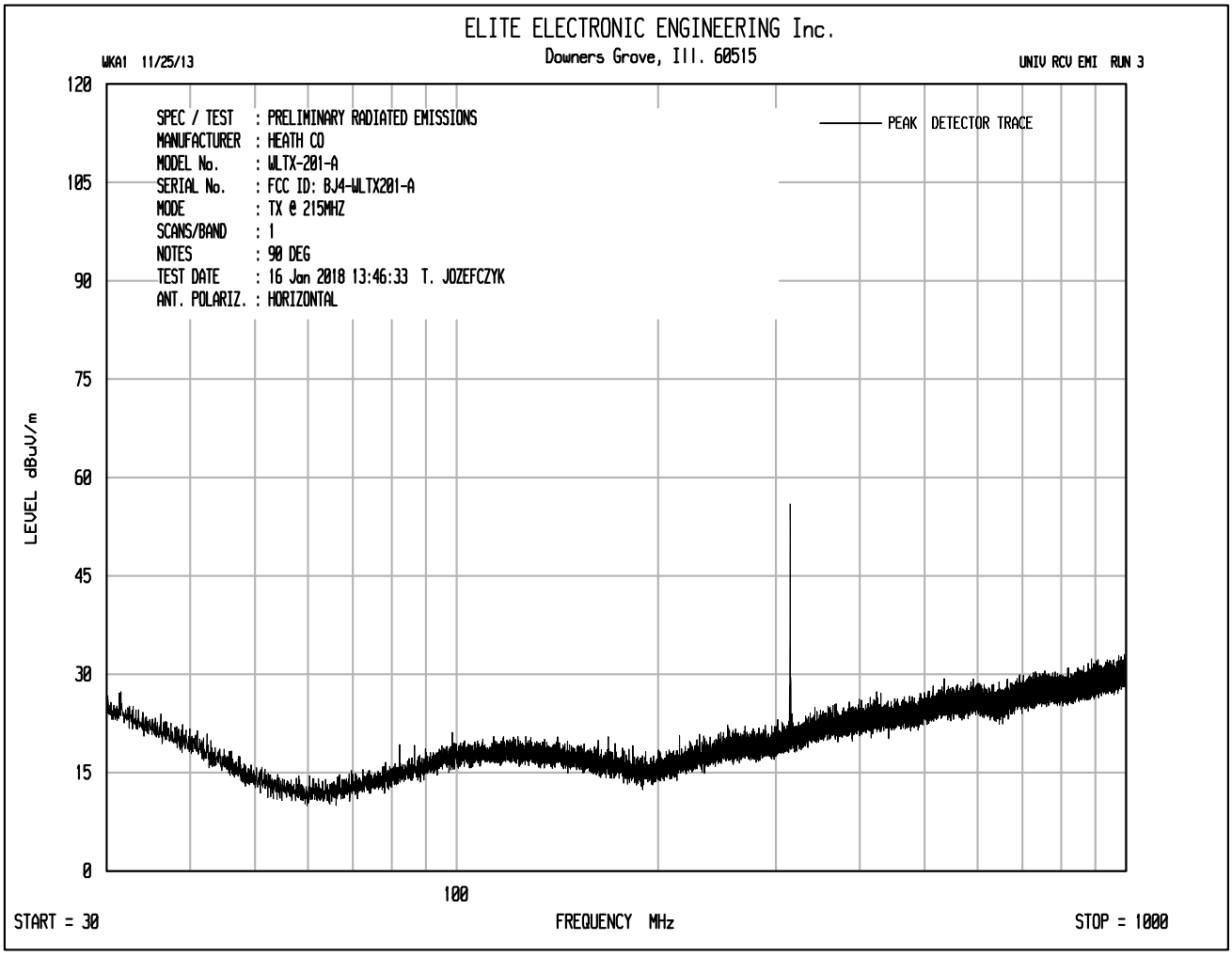
DUTY CYCLE – PERIOD

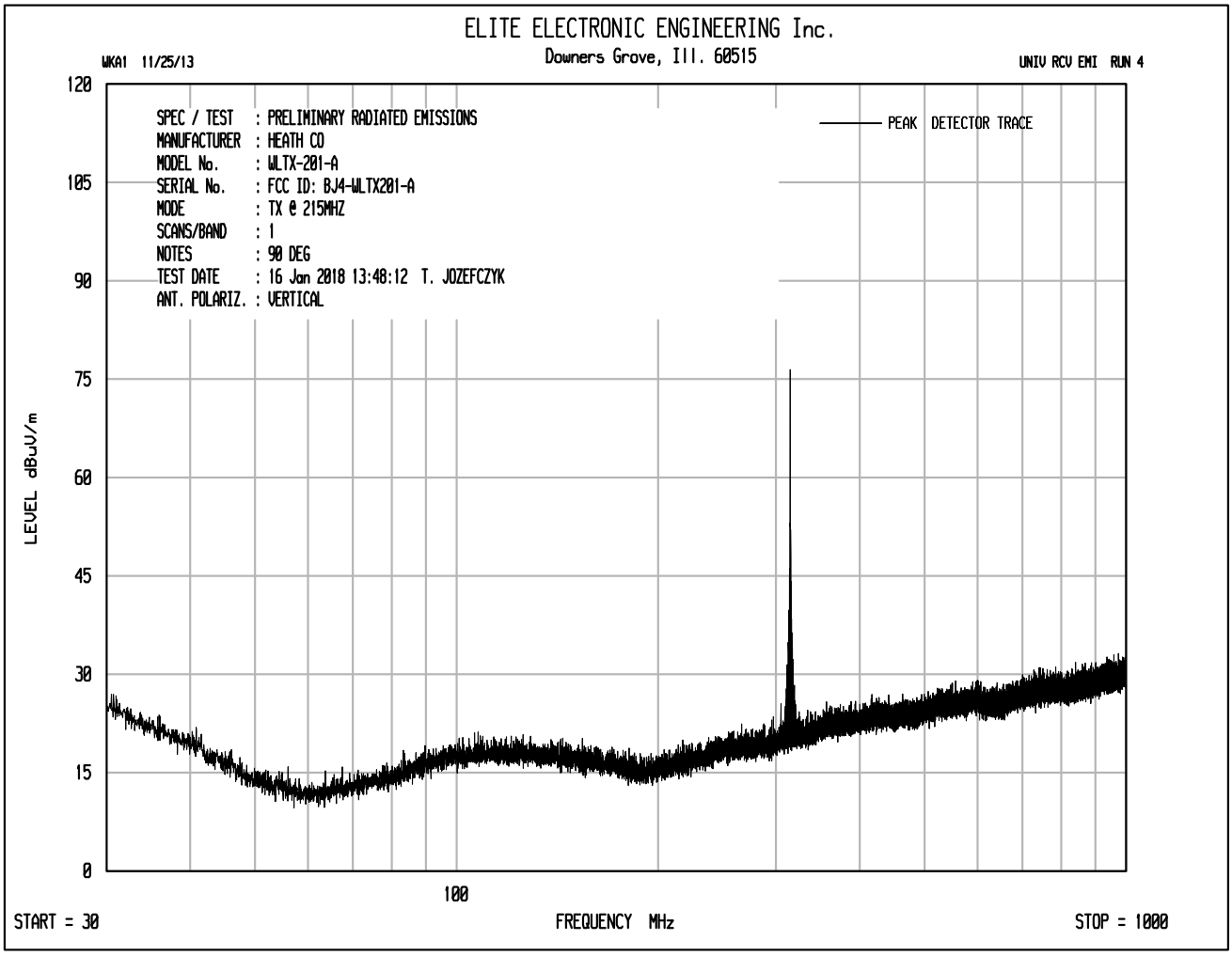
MANUFACTURER : HeathCo LLC
TEST ITEM : Chime Transmitter
MODEL NUMBER : WLTX-301-A
TEST MODE : Tx – 315MHz

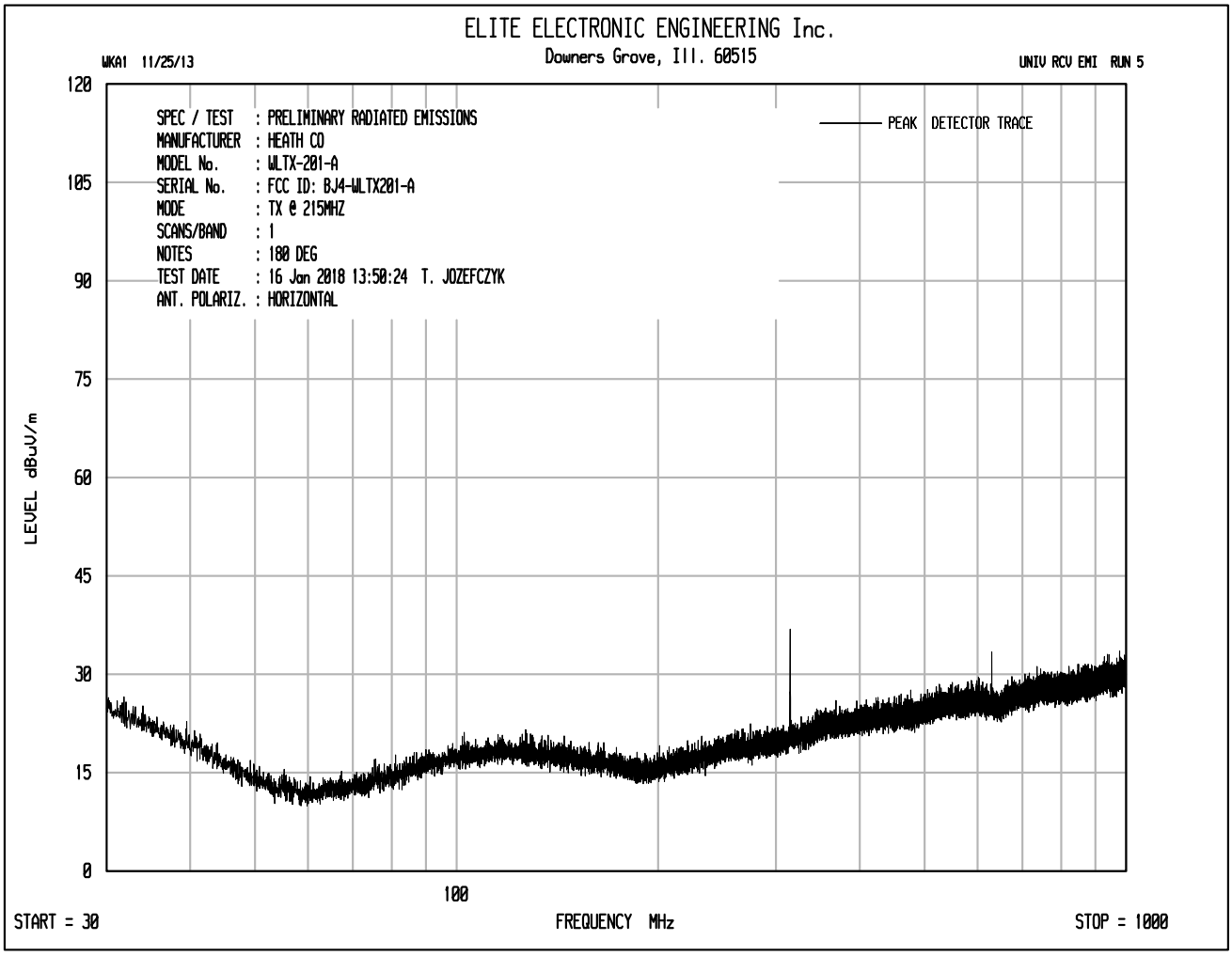
NOTES – The period was found to be 21.35ms.

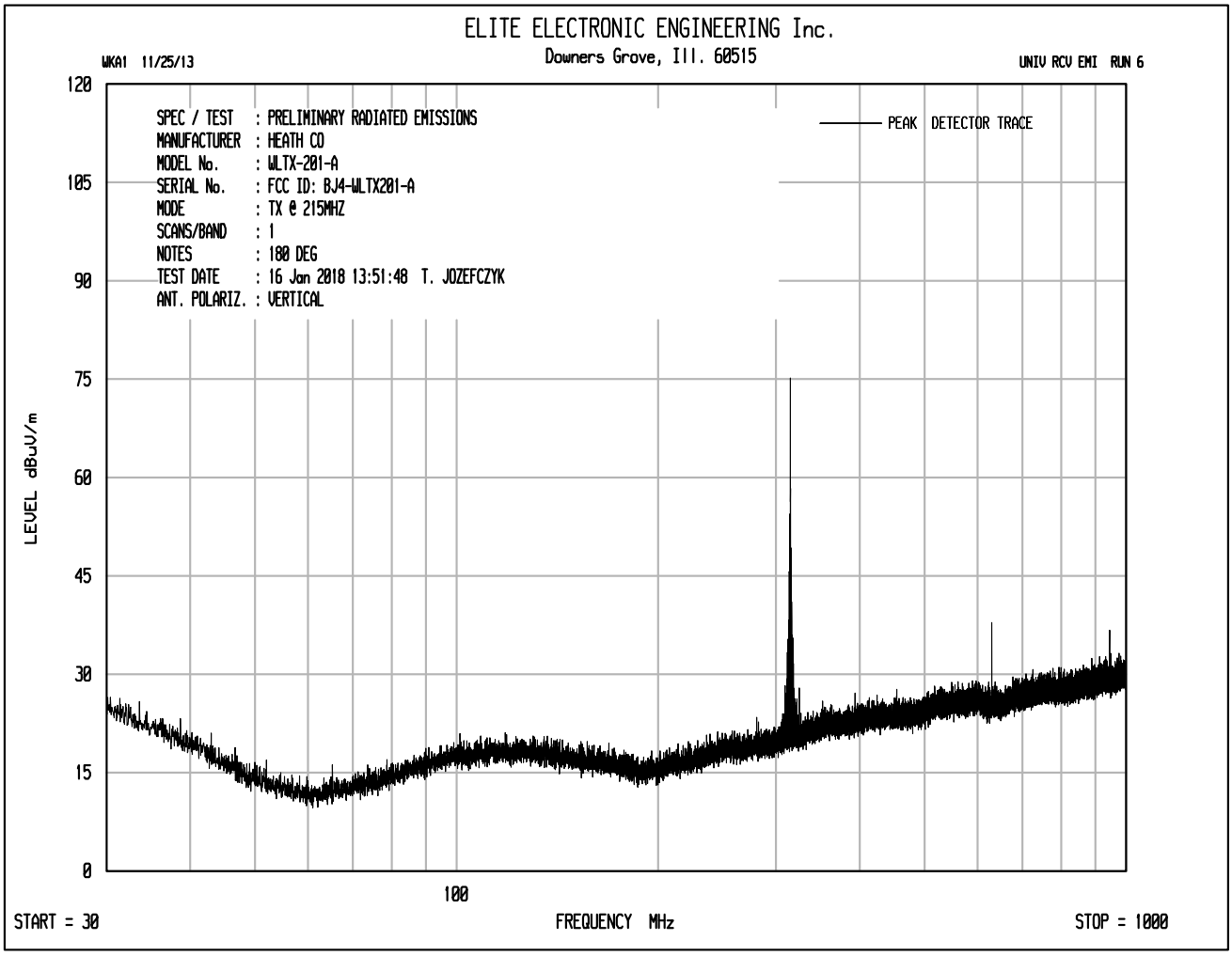

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 1
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 215MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 16 Jan 2018 13:42:14 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

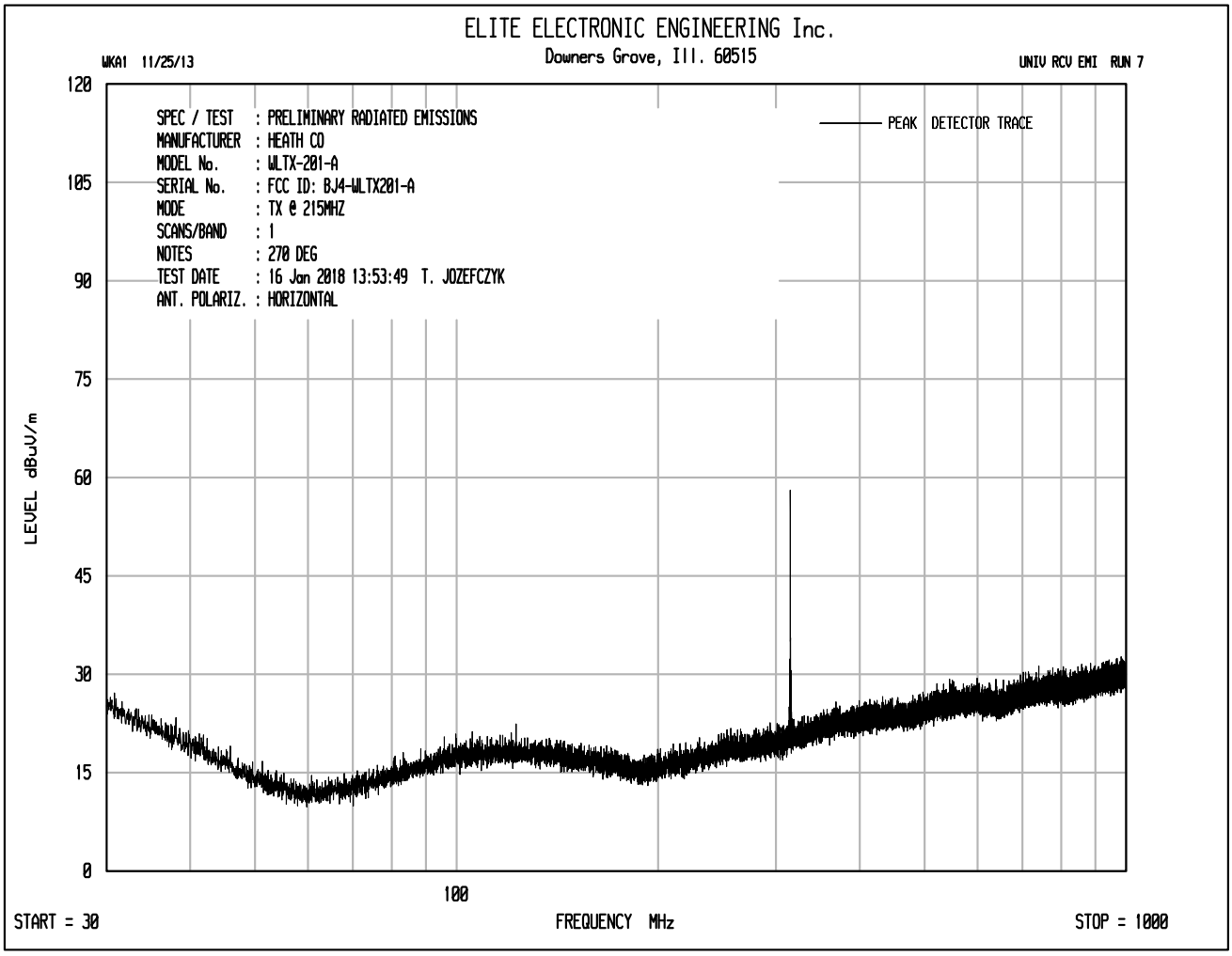

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 215MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 16 Jan 2018 13:45:05 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

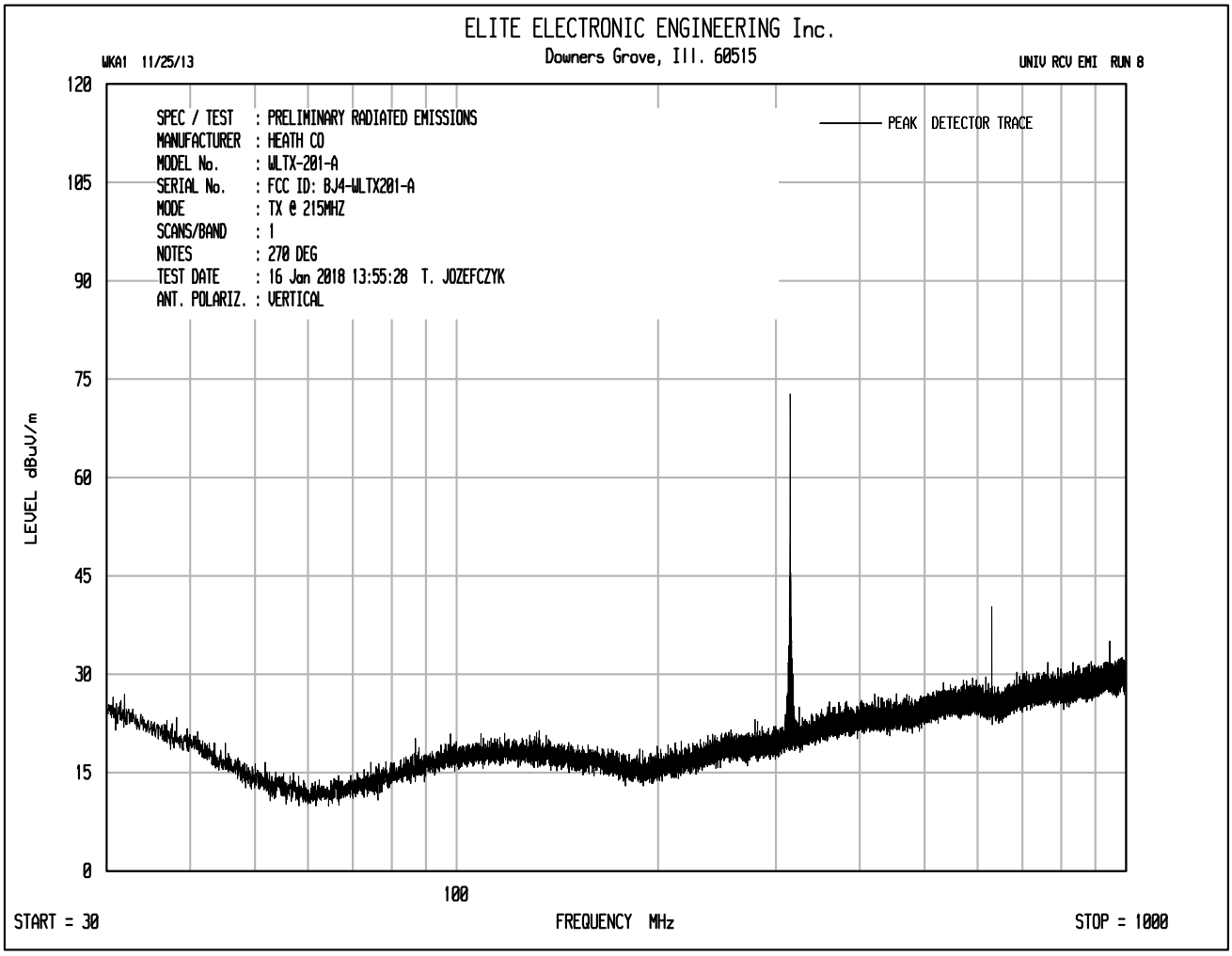

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 215MHZ
SCANS/BAND : 1
NOTES : 90 DEG
TEST DATE : 16 Jan 2018 13:46:33 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

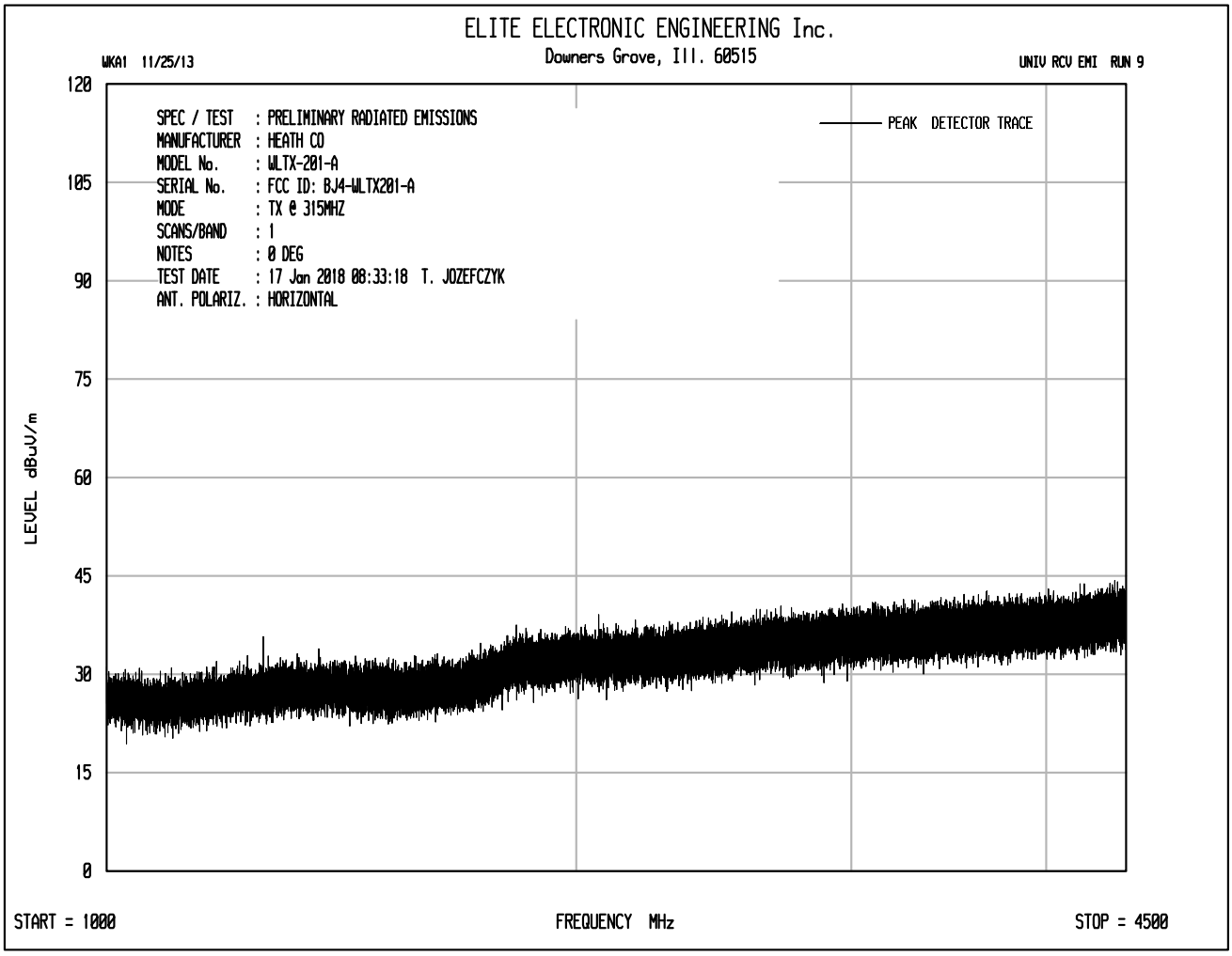

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 215MHZ
SCANS/BAND : 1
NOTES : 90 DEG
TEST DATE : 16 Jan 2018 13:48:12 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

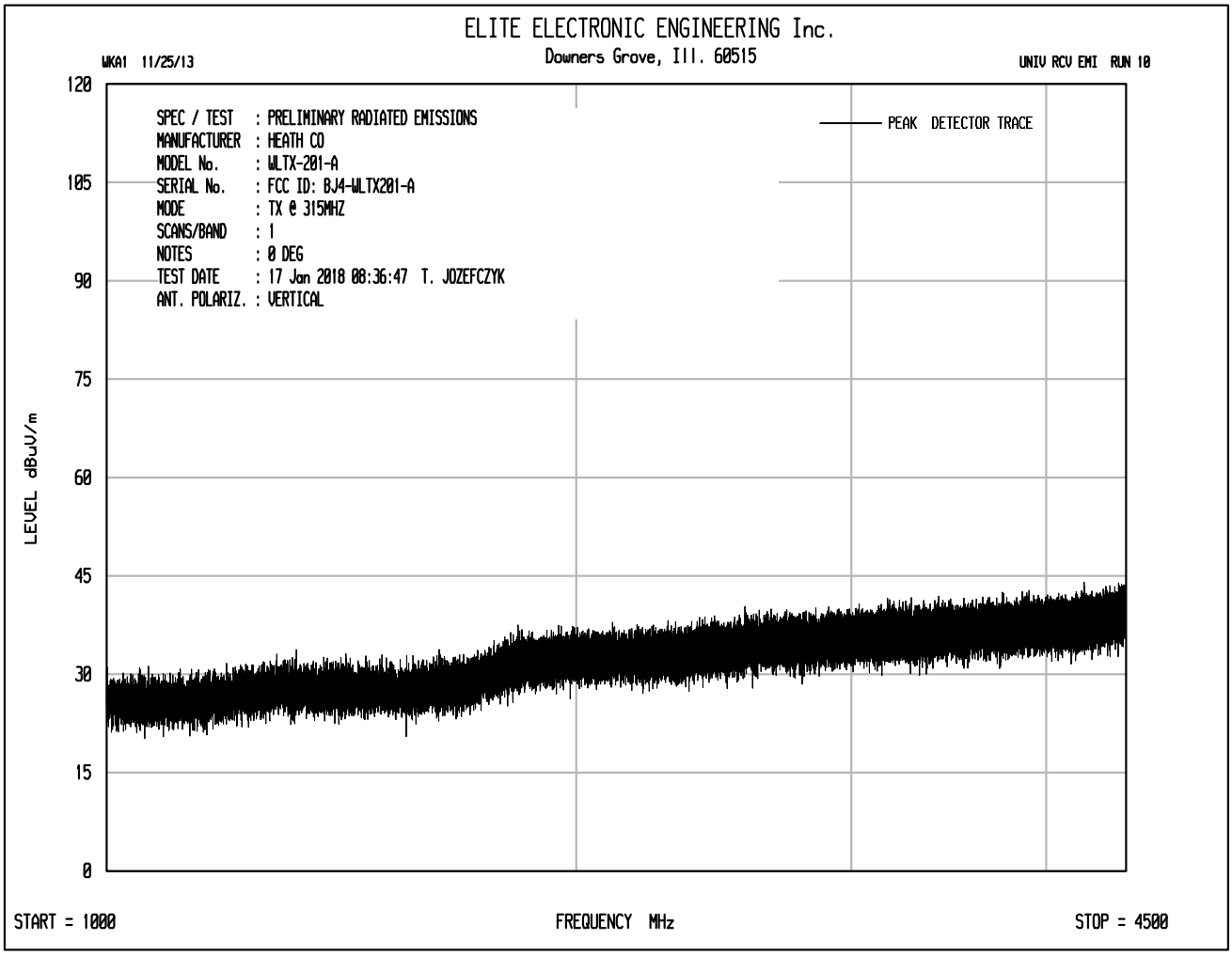

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 215MHZ
SCANS/BAND : 1
NOTES : 180 DEG
TEST DATE : 16 Jan 2018 13:50:24 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

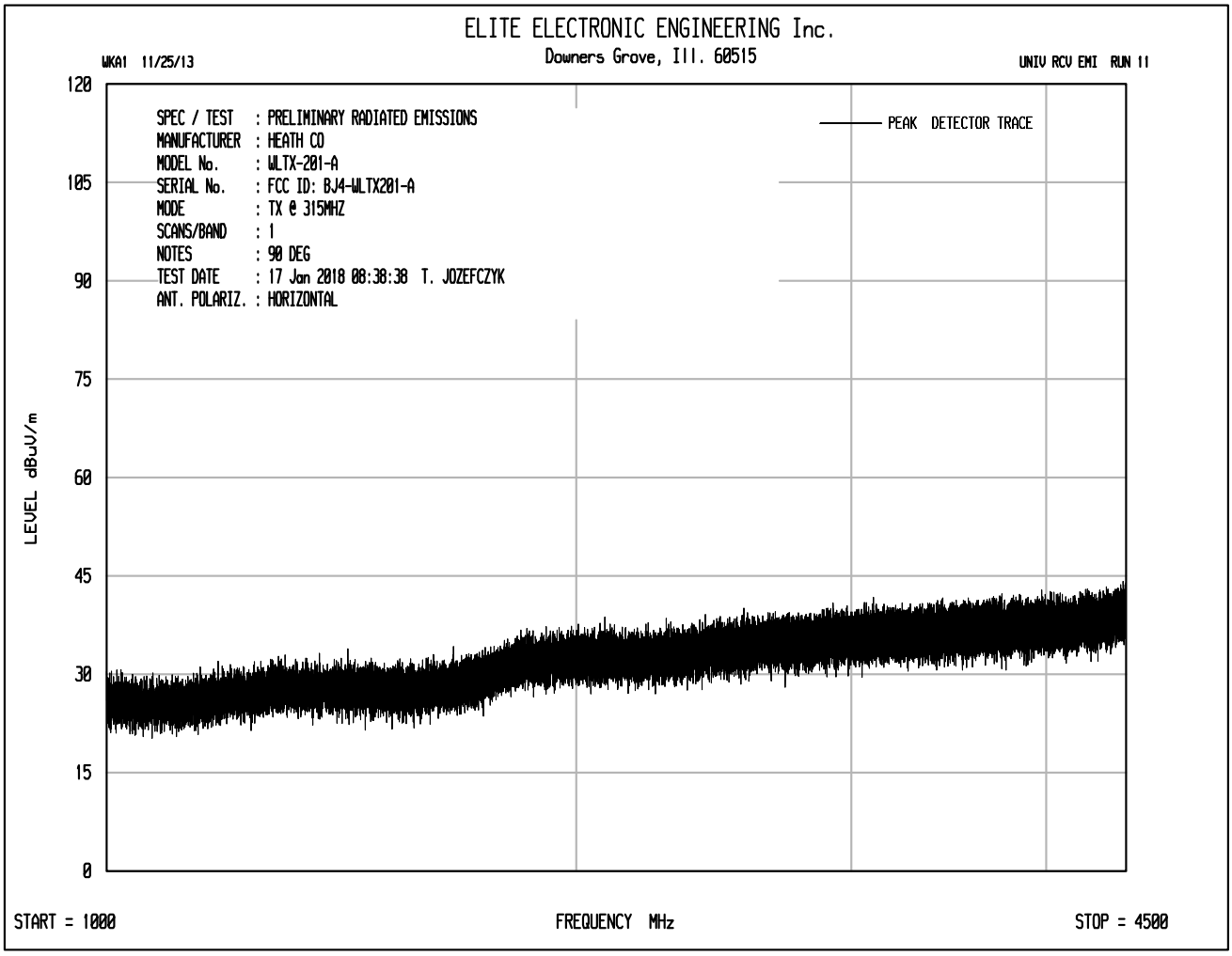

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 215MHZ
SCANS/BAND : 1
NOTES : 180 DEG
TEST DATE : 16 Jan 2018 13:51:48 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

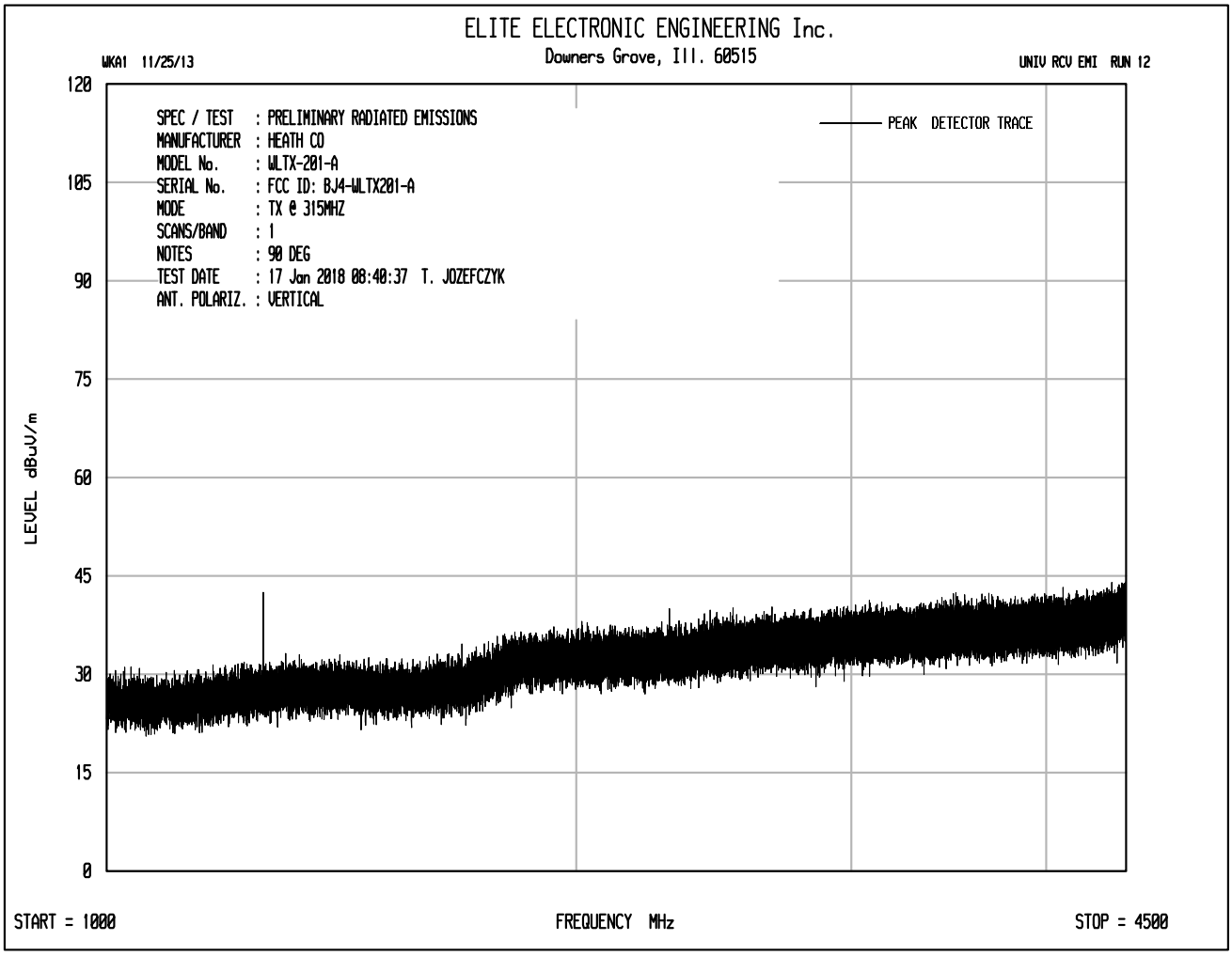

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 215MHZ
SCANS/BAND : 1
NOTES : 270 DEG
TEST DATE : 16 Jan 2018 13:53:49 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

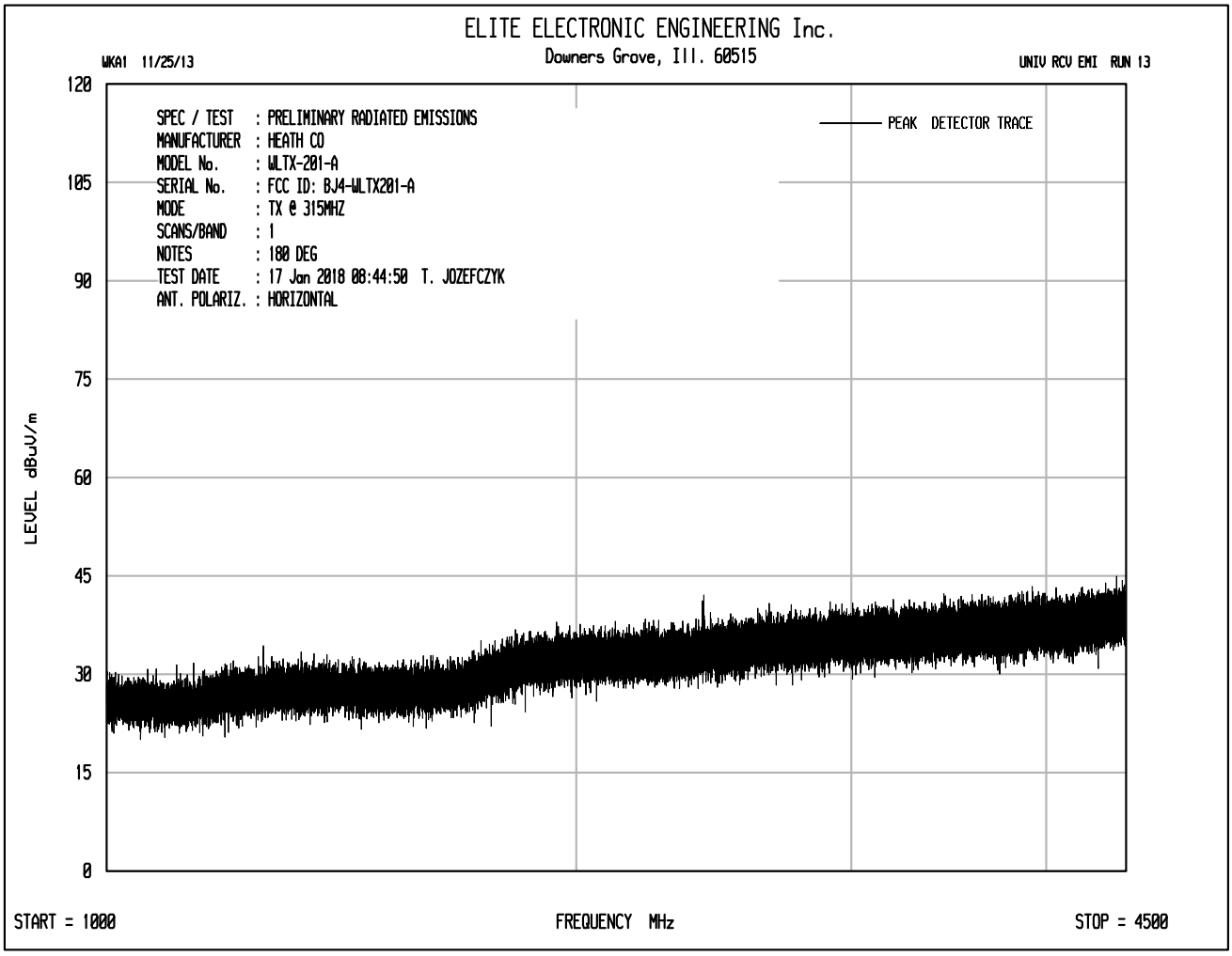

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 8
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 215MHZ
SCANS/BAND : 1
NOTES : 270 DEG
TEST DATE : 16 Jan 2018 13:55:28 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

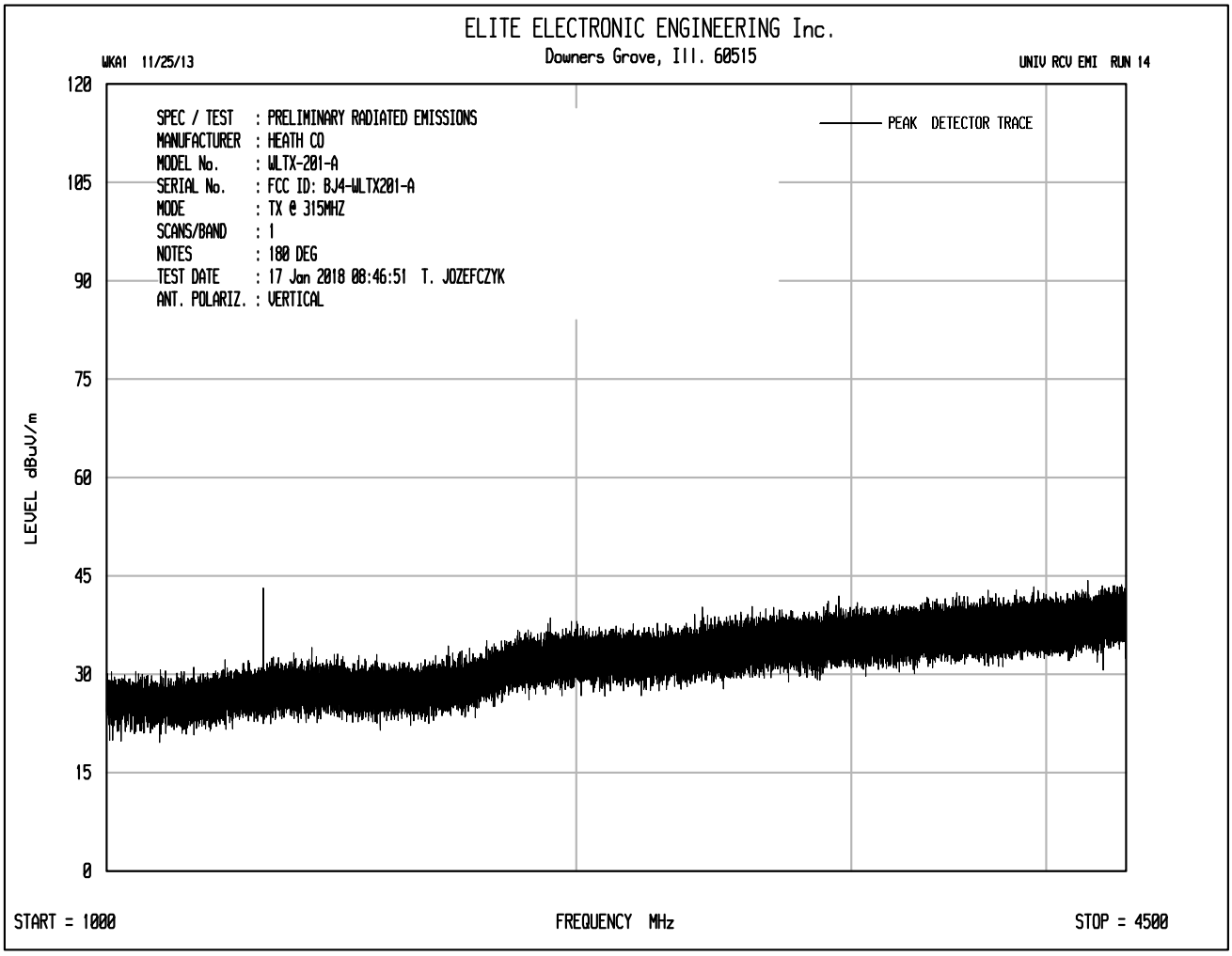

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 9
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES : 0 DEG
TEST DATE : 17 Jan 2018 08:33:18 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500

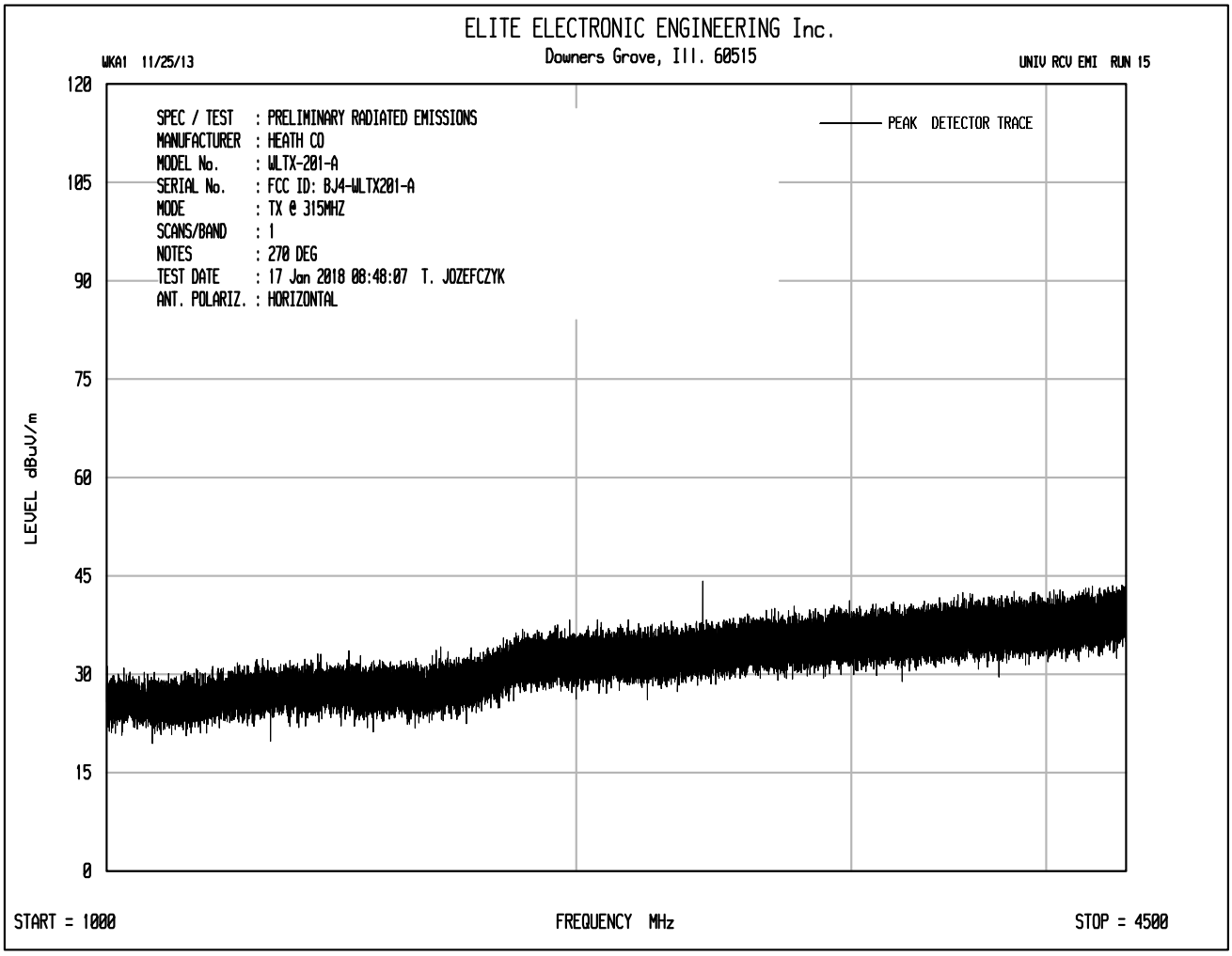

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES : 0 DEG
TEST DATE : 17 Jan 2018 08:36:47 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500

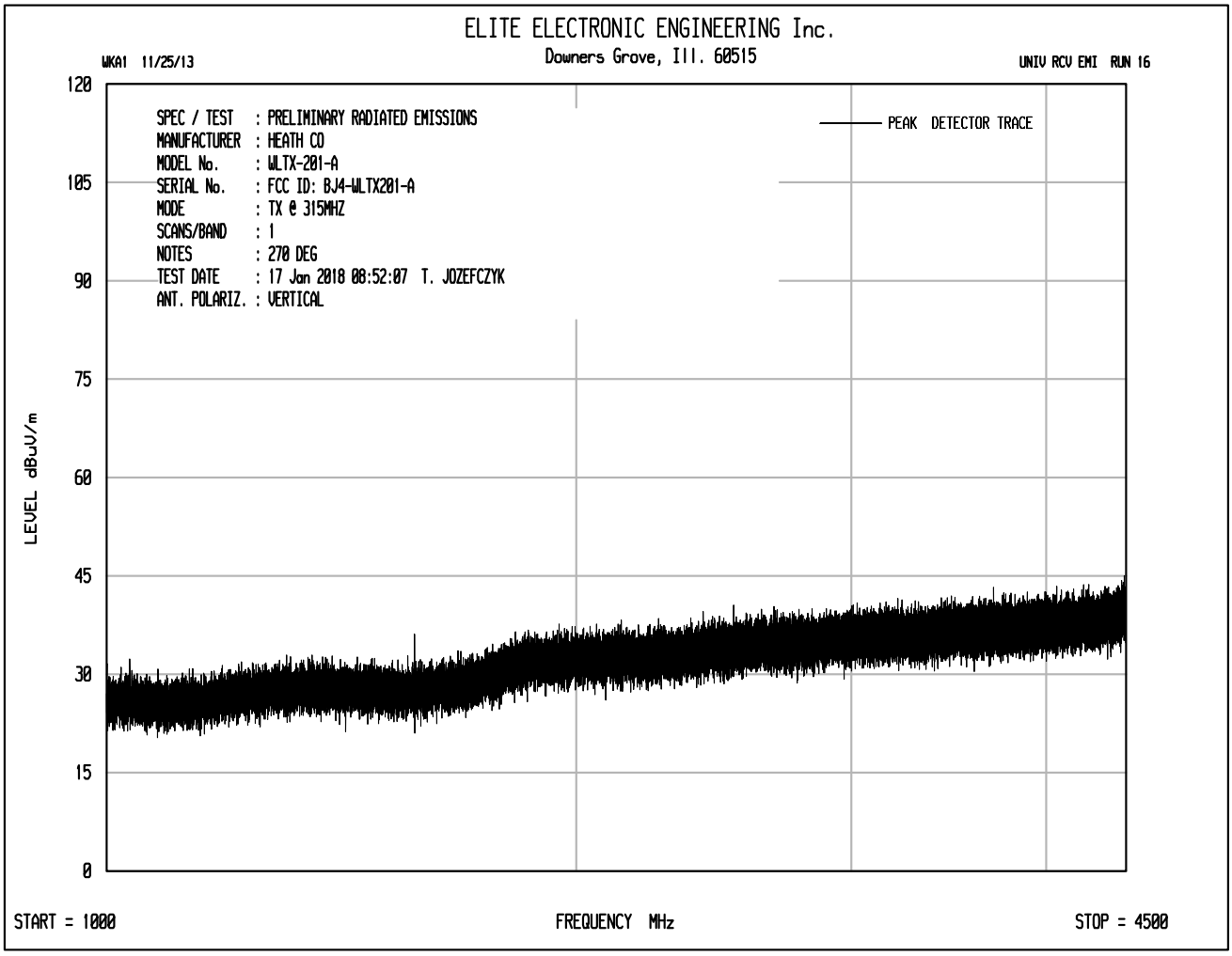

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES : 90 DEG
TEST DATE : 17 Jan 2018 08:38:38 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 12
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES : 90 DEG
TEST DATE : 17 Jan 2018 08:40:37 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 13
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES : 180 DEG
TEST DATE : 17 Jan 2018 08:44:50 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 14
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES : 180 DEG
TEST DATE : 17 Jan 2018 08:46:51 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500

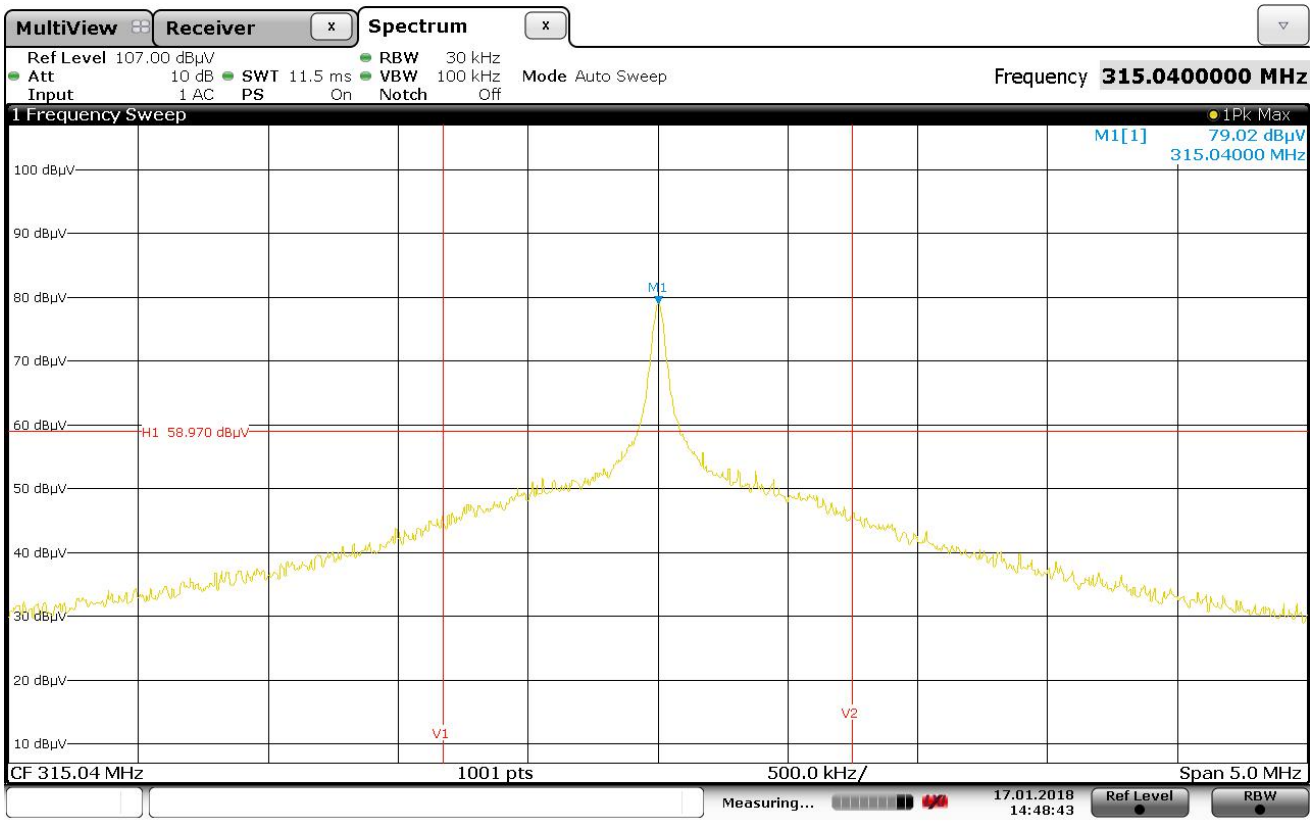

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 15
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES : 270 DEG
TEST DATE : 17 Jan 2018 08:48:07 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 16
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : HEATH CO
MODEL No. : WLTX-201-A
SERIAL No. : FCC ID: BJ4-WLTX201-A
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES : 270 DEG
TEST DATE : 17 Jan 2018 08:52:07 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500

DATA SHEET

Manufacturer : HeathCo LLC
Test Item : Chime Transmitter
Model No. : WLTX-301-A
Mode : Tx – 315MHz
Test Specification : FCC-15.231, RSS-210 Radiated Spurious Emissions – Harmonics

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total (dBµV/m)	Total (µV/m)	Limit (µV/m)	Margin (dB)
315.000	H	37.7	1.7	19.3	0.0	-10.2	48.4	263.4	6041.7	-27.2
315.000	V	59.9	1.7	19.3	0.0	-10.2	70.6	3389.1	6041.7	-5.0
630.000	H	18.9	2.4	25.0	0.0	-10.2	36.2	64.3	604.2	-19.5
630.000	V	20.1	2.4	25.0	0.0	-10.2	37.3	73.2	604.2	-18.3
945.000	H	19.0	3.0	26.7	0.0	-10.2	38.4	83.3	604.2	-17.2
945.000	V	19.2	3.0	26.7	0.0	-10.2	38.6	85.4	604.2	-17.0
1260.000	H	12.6	3.3	29.0	0.0	-10.2	34.7	54.5	604.2	-20.9
1260.000	V	15.3	3.3	29.0	0.0	-10.2	37.4	74.3	604.2	-18.2
1575.000	H	17.3	3.6	28.3	0.0	-10.2	39.1	89.9	500.0	-14.9
1575.000	V	19.1	3.6	28.3	0.0	-10.2	40.9	110.5	500.0	-13.1
1890.000	H	12.1	3.9	30.9	0.0	-10.2	36.7	68.3	604.2	-18.9
1890.000	V	16.5	3.9	30.9	0.0	-10.2	41.1	113.9	604.2	-14.5
2205.000	H	12.4	4.2	31.6	0.0	-10.2	38.0	79.3	500.0	-16.0
2205.000	V	13.1	4.2	31.6	0.0	-10.2	38.7	85.9	500.0	-15.3
2520.000	H	12.8	4.4	32.2	0.0	-10.2	39.2	91.1	604.2	-16.4
2520.000	V	13.0	4.4	32.2	0.0	-10.2	39.3	92.8	604.2	-16.3
2835.000	H	13.0	4.7	32.6	0.0	-10.2	40.1	101.0	500.0	-13.9
2835.000	V	12.6	4.7	32.6	0.0	-10.2	39.7	96.1	500.0	-14.3
3150.000	H	13.9	5.1	32.9	0.0	-10.2	41.7	122.3	604.2	-13.9
3150.000	V	13.4	5.1	32.9	0.0	-10.2	41.2	115.3	604.2	-14.4

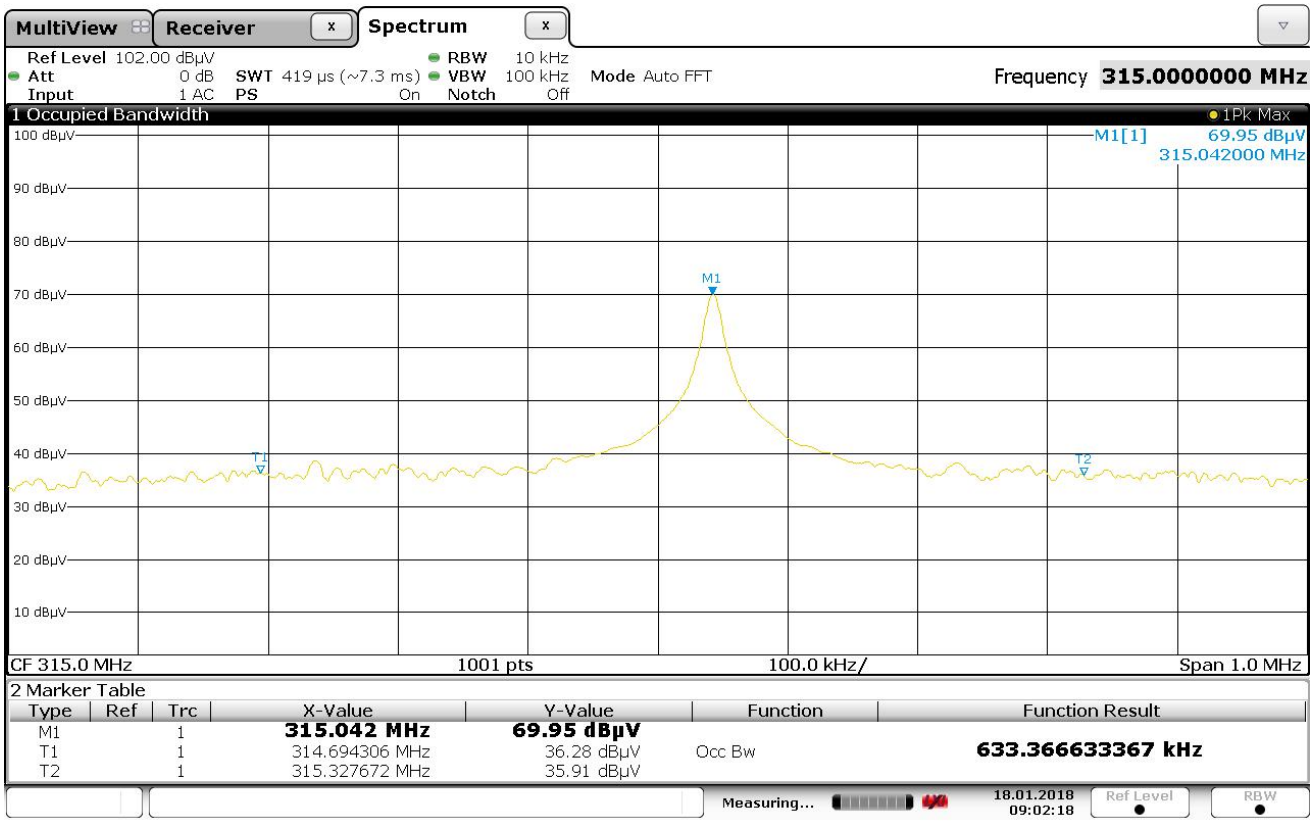


Date: 17.JAN.2018 14:48:44

OCCUPIED BANDWIDTH – 0.25% BANDWIDTH

MANUFACTURER : HeathCo LLC
TEST ITEM : Chime Transmitter
MODEL NUMBER : WLTX-301-A
TEST MODE : Tx – 315MHz

NOTES – The horizontal line is placed 20dB down from peak. The vertical lines are placed at ±0.7875 (0.0025*315) from the transmitted signal, so V1 = 314.2125MHz and V2 = 315.7875MHz.



Date: 18.JAN.2018 09:02:18

OCCUPIED BANDWIDTH – 99% BANDWIDTH

MANUFACTURER : HeathCo LLC
TEST ITEM : Chime Transmitter
MODEL NUMBER : WLTX-301-A
TEST MODE : Tx – 315MHz

NOTES – The 99% Occupied Bandwidth is 633.36kHz.