



## Measurement of RF Emissions from a Accutech Security, LLC TenderCare Security System

For Accutech Security, LLC  
10125 S 52nd Street  
Franklin, WI 53132

P.O. Number P028203  
Date Tested May 23 – 24, 2018  
Test Personnel Richard King  
Test Specification FCC "Code of Federal Regulations" Title 47, Part 15,  
Subpart C, Sections 15.207 and 15.209 for  
Intentional Radiators  
ISED Canada RSS-Gen

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**THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF ELITE ELECTRONIC ENGINEERING INCORPORATED.**



**REVISION HISTORY**

Revision	Date	Description
—	29 May 2018	Initial release

## Measurement of RF Emissions from an Accutech Security, LLC TenderCare Security System

### 1. INTRODUCTION

#### 1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on an Accutech Security, LLC TenderCare Security System, hereinafter referred to as the Equipment Under Test (EUT). No Serial Number was assigned to the EUT. The EUT was designed to transmit at approximately 130kHz, 132kHz and 134kHz using an external antenna. The EUT was manufactured and submitted for testing by Accutech Security, LLC located in Franklin, WI.

The EUT was also designed to receive in the 418MHz range using an external mounted antenna. No testing was performed on the 418MHz receiver per Accutech Security, LLC personnel.

#### 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 207 and 209 for Intentional Radiators. Testing was performed in accordance with ANSI C63.4-2014.

The test series was also performed to determine if the EUT meets the conducted and radiated RF emission requirements of the ISED Canada Radio Standards Specification RSS-Gen Sections 8.8 and 8.9 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 23°C and the relative humidity was 45%.

### 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"
- ISED Canada Radio Standards Specification, RSS-Gen, "Spectrum Management and Telecommunications Radio Standards Specification, General Requirements for Compliance of Radio Apparatus", Issue 4, November 2014
- ISED Canada Radio Standards Specification, RSS-210, "Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment", Issue 9, August 2016
- 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 an Accutech Security, LLC TenderCare Security System. A block diagram of the EUT setup is shown as Figure 1. A photograph of the EUT is shown as Figure 2.

##### 3.1.1. Power Input

The EUT was powered with 115V, 60Hz via 1.8 meter, 3-wire power cable.

##### 3.1.2. Peripheral Equipment

The following peripheral equipment was submitted with the EUT:

Item	Description
Keypad	Accutech no model or serial number was assigned.
Sensors	Accutech no model or serial number was assigned.

##### 3.1.3. Signal Input/Output Leads

The following interconnect cables were submitted with the EUT:

Item	Description
5 wire	6 feet long connecting the Keypad to the EUT
2 wire	6 feet long connecting the Sensor to the EUT
2 wire	6 feet long connecting the antenna to the EUT

##### 3.1.4. Grounding

The EUT was not grounded during the tests.

##### 3.1.5. Frequency of EUT

The EUT was equipped with a 134kHz transmitter. Per 15.33(a)(1), for an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:

- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

#### 3.2. Software

The EUT did not utilize firmware or software.

#### 3.3. Operational Mode

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

All tests were run separately with the EUT programmed to operate in the following modes:

- Transmit at 130kHz; Gain setting set to half point.
- Transmit at 132kHz; Gain setting set to half point.
- Transmit at 134kHz; Gain setting set to half point.



3.4. EUT Modifications

No modifications to the EUT were required for compliance.

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. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

Conducted and radiated emissions tests were performed with an EMI receiver with internal peak, quasi-peak, and average detectors. All measurements were performed using the bandwidths specified by the FCC.

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.

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. Transmitter

5.1.1. Powerline Conducted Emissions

5.1.1.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Per 15.207(a) and ISED Canada RSS-Gen section 8.8, all radio frequency voltages on the power lines of a transmitter shall be below the values shown below when using a quasi-peak or average detector:

Frequency MHz	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 – 0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5 - 5	56	46
5 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: If the levels measured using the QP detector meet both the QP and the Average limits, the EUT is considered to have met both requirements and measurements do not need to be performed using the Average detector.

#### 5.1.1.2 Procedures

The interference on each power lead of the EUT was measured by connecting the measuring equipment to the appropriate meter terminal of the Line Impedance Stabilization Network (LISN). The meter terminal of the LISN not under test was terminated with 50 ohms.

- a) The EUT was operated in the Normal Operation mode.
- b) Measurements were first made on the 115V, 60Hz high line of the EUT.
- c) The frequency range from 150 kHz to 30 MHz was broken up into smaller frequency sub-bands.
- d) Conducted emissions measurements were taken on the first frequency sub-band using a peak detector.
- e) The data thus obtained was then searched by the computer for the highest levels. Any emissions levels that were within 10dB of the average limit were then measured again using both a quasi-peak detector and an average detector. (If no peak readings were within 10dB of the average limit, quasi-peak and average readings were taken on the highest emissions levels measured during the peak detector scan.)
- f) Steps (d) and (e) were repeated for the remainder of the frequency sub-bands until the entire frequency range from 150kHz to 30MHz was investigated. The peak trace was automatically plotted. The plot also shows quasi-peak and average readings that were taken on discrete frequencies. A table showing the quasi-peak and average readings was also generated. This tabular data compares the quasi-peak and average conducted emissions to the applicable conducted emissions limits. The resultant voltage level (VL) is a summation in decibels (dB) of the receiver meter reading (MTR) and the cable loss factor (CF).

$$\text{Formula 1: VL (dBuV) = MTR (dBuV) + CF (dB)}$$

- g) Steps (c) through (f) were repeated on the 115V, 60Hz return line of the EUT.

#### 5.1.1.3 Results

The plots and tabular data of the peak, quasi-peak, and average conducted voltage levels acquired from each input power line with the EUT transmitting at 130kHz, 132kHz and 134kHz are shown on pages 15 through 26.

All power line conducted emissions measured from the EUT were within the specification limits.

Photographs of the test configuration which yielded the highest or worst case, conducted emission levels are shown in Figure 3.



5.1.2. Radiated Measurements

5.1.2.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.209(a) and ISED Canada RSS-Gen, Section 8.9, all radio frequency emissions from an intentional radiator shall be below the limits shown in the following table:

Frequency MHz	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	3
30.0-88.0	100	3
88.0-216.0	150	3
216.0-960.0	200	3
Above 960	500	3

Note 1: The lower limit shall apply at the transition frequencies.

In addition, per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.209(d) and ISED Canada RSS-Gen, Section 8.9, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

5.1.3. 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, an active loop measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 10kHz to 30MHz was investigated using a peak detector function.

The final open field emission tests were then manually performed over the frequency range of 10kHz to 30MHz using an active loop antenna. All significant broadband and narrowband signals were measured and recorded. A 200Hz bandwidth was used for all measurements below 150kHz. A quasi-peak detector with a 9kHz bandwidth was used for all measurements above 150kHz except in the 110-490 kHz band. In the 110-490 kHz band an average detector was used.

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) The active loop antenna was placed at a height of 1 meter.
- 3) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
- 4) With the loop antenna in the vertical polarization, the loop antenna was rotated through 360 degrees.

The resultant field strength (FS) is a summation in decibels (dB) of the receiver meter reading (MTR), the antenna correction factor (AF), and the cable loss factor (CF). If peak reading are taken, and the standard calls





out an average limit, the peak readings are converted to average readings by adding a duty cycle correction factor (DC). If an external pre-amplifier is used, the total is reduced by its gain (-PA). If a distance correction (DC) is required, it is added to the total. (Per 15.231(f)(2), at frequencies below 30MHz, measurements may be made at a distance closer than that specified. When performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by using the square of an inverse linear distance extrapolation factor (40 dB/decade).)

$$\text{Formula 1: FS (dBuV/m)} = \text{MTR (dBuV)} + \text{AF (dB/m)} + \text{CF (dB)} + \text{DC (dB)} + (- \text{PA (dB)}) + \text{DC (dB)}$$

To convert the Field Strength dBuV/m term to uV/m, the dBuV/m is first divided by 20. The Base 10 AntiLog is taken of this quotient. The result is the Field Strength value in uV/m terms.

$$\text{Formula 2: FS (uV/m)} = \text{AntiLog} [(\text{FS (dBuV/m)})/20]$$

#### 5.1.4. Results

The preliminary plots and final open area radiated levels, with the EUT transmitting at 130kHz, 132kHz and 134kHz are presented on data pages 27 through 35. The plots are presented for a reference only, and are not used to determine compliance.

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 Figure 4.

The 99% bandwidth measured was 437.5Hz.

## 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 Accutech Security, LLC upon completion of the tests.

## 7. CONCLUSIONS

It was determined that, the Accutech Security, LLC TenderCare Security System did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.209 for Intentional Radiators when tested per ANSI C63.4-2014.

It was also determined that, the Accutech Security, LLC TenderCare Security System did fully meet the conducted and radiated RF emission requirements of the ISED Canada Radio Standards Specification, RSS-Gen, Sections 8.8 and 8.9 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	
PLF1	CISPR16 50UH LISN	ELITE	CISPR16/70A	001	.15-30MHz	5/7/2018	5/7/2019
PLF3	CISPR16 50UH LISN	ELITE	CISPR16/70A	003	.15-30MHz	5/7/2018	5/7/2019
RBG3	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101592	2HZ-44GHZ	2/20/2018	2/20/2019
T1EQ	10DB 25W ATTENUATOR	WEINSCHTEL	46-10-34	CD6791	DC-18GHZ	4/23/2018	4/23/2020
VBR8	CISPR EN FCC CE VOLTAGE.exe						
XLQ3	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	---	DC-2GHZ	1/9/2018	1/9/2020

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.

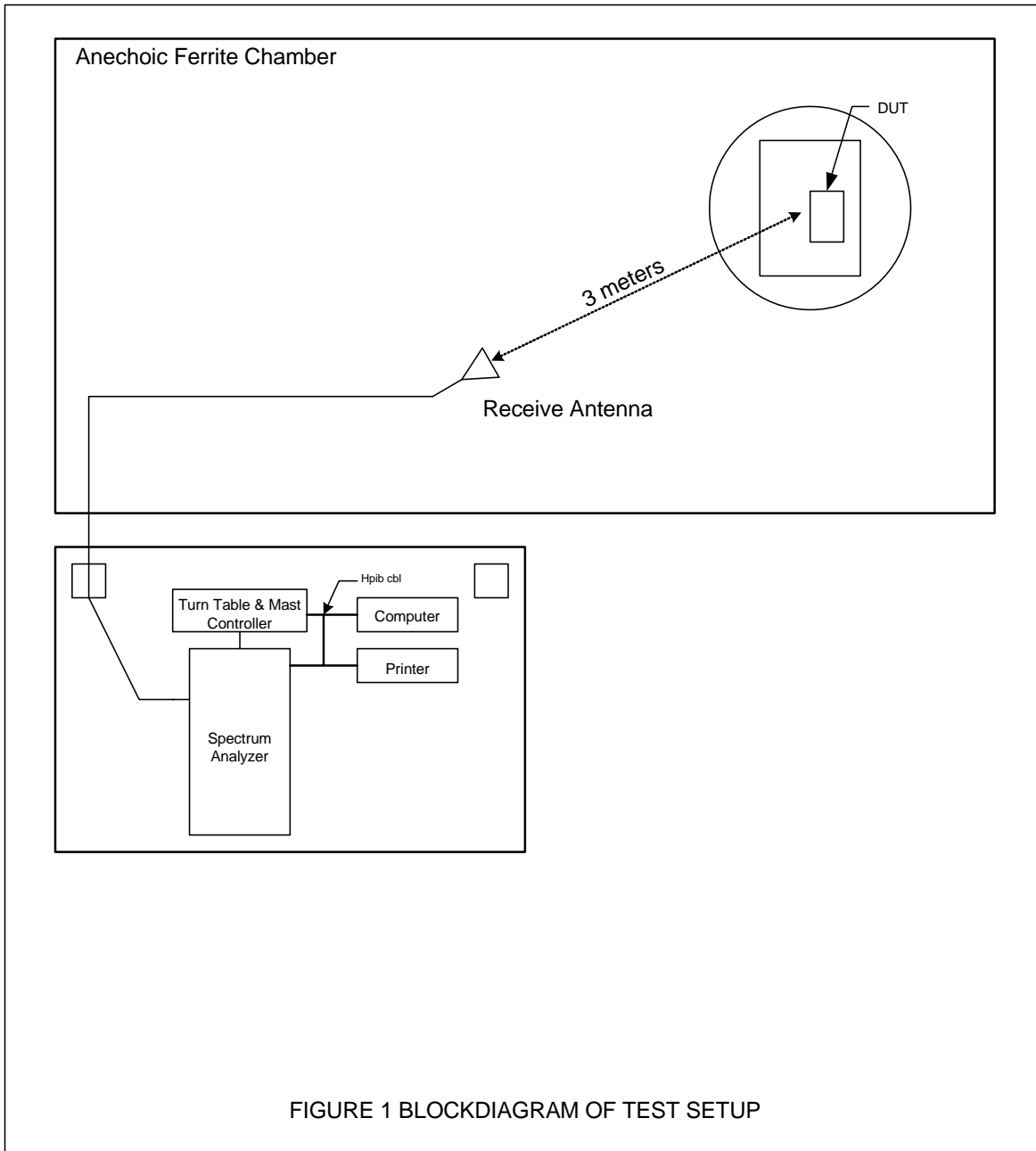


Figure 2



Photograph of the EUT

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



## FCC Part 15 Subpart B Conducted Emissions Test Significant Emissions Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 130kHz  
Line Tested : L1  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes :  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 10:52:11 AM  
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

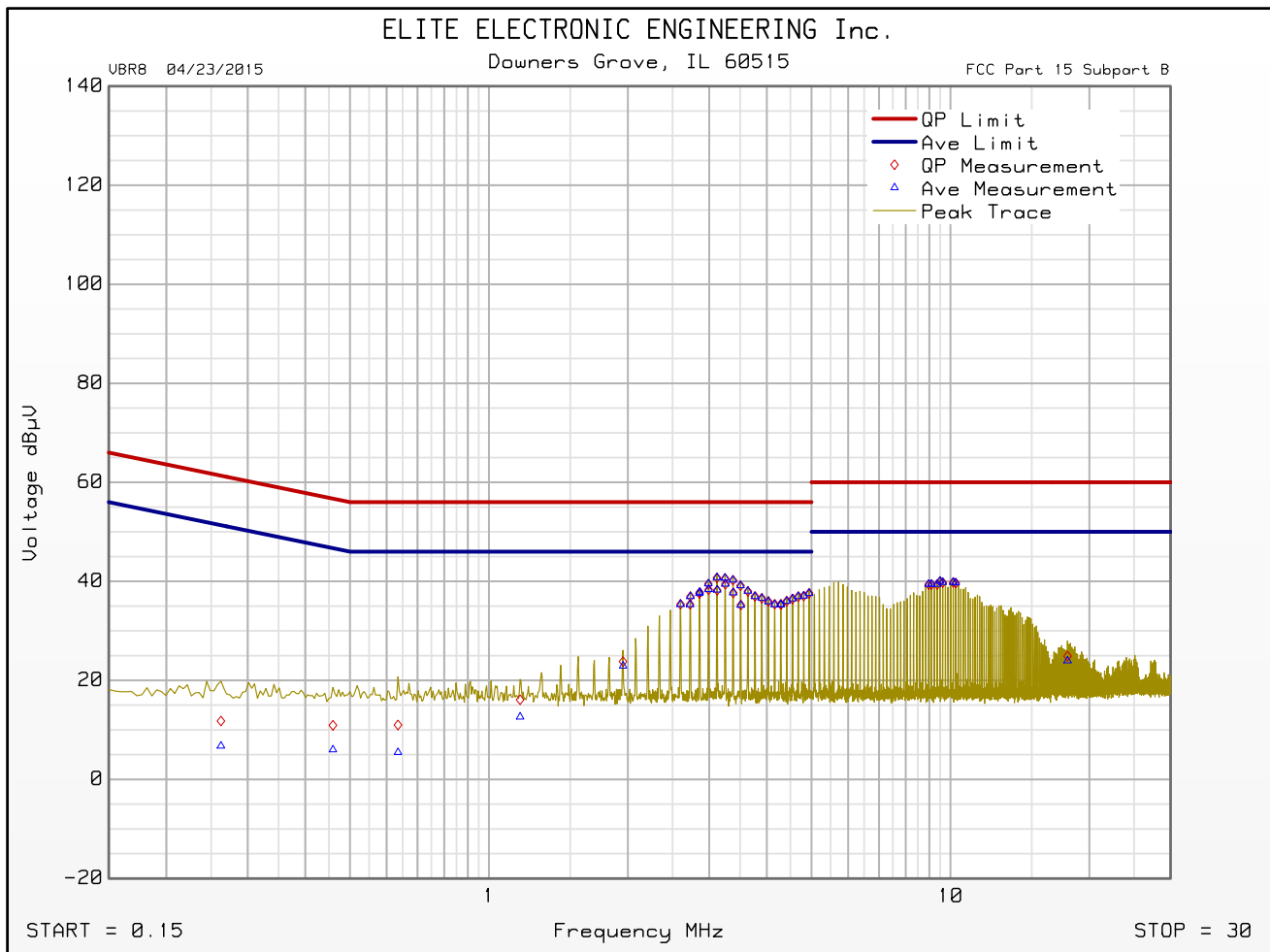
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.263	11.8	61.4		6.8	51.4	
0.459	10.9	56.7		6.0	46.7	
0.635	11.0	56.0		5.5	46.0	
1.168	16.1	56.0		12.6	46.0	
1.952	23.8	56.0		22.9	46.0	
2.732	36.9	56.0		37.0	46.0	
2.862	37.8	56.0		37.8	46.0	
2.988	39.5	56.0		39.5	46.0	
3.119	40.7	56.0		40.8	46.0	
3.248	40.6	56.0		40.7	46.0	
3.379	40.2	56.0		40.3	46.0	
3.509	39.1	56.0		39.2	46.0	
3.640	38.0	56.0		38.1	46.0	
3.770	37.0	56.0		37.0	46.0	
3.901	36.6	56.0		36.6	46.0	
4.418	36.0	56.0		36.0	46.0	
4.549	36.5	56.0		36.5	46.0	
4.679	36.9	56.0		37.0	46.0	
4.810	37.0	56.0		37.0	46.0	
4.940	37.6	56.0		37.6	46.0	
8.969	39.4	60.0		39.5	50.0	
9.491	40.0	60.0		40.1	50.0	
17.938	24.9	60.0		24.0	50.0	



# FCC Part 15 Subpart B Conducted Emissions Test Cumulative Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 130kHz  
Line Tested : L1  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes :  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 10:52:11 AM



Emissions Meet QP Limit  
Emissions Meet Ave Limit





# FCC Part 15 Subpart B Conducted Emissions Test Significant Emissions Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
 Model : ESI  
 DUT Mode : Tx @ 130kHz  
 Line Tested : L2  
 Scan Step Time [ms] : 30  
 Meas. Threshold [dB] : -10  
 Notes :  
 Test Engineer : R. King  
 Limit : Class B  
 Test Date : May 23, 2018 10:45:25 AM  
 Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

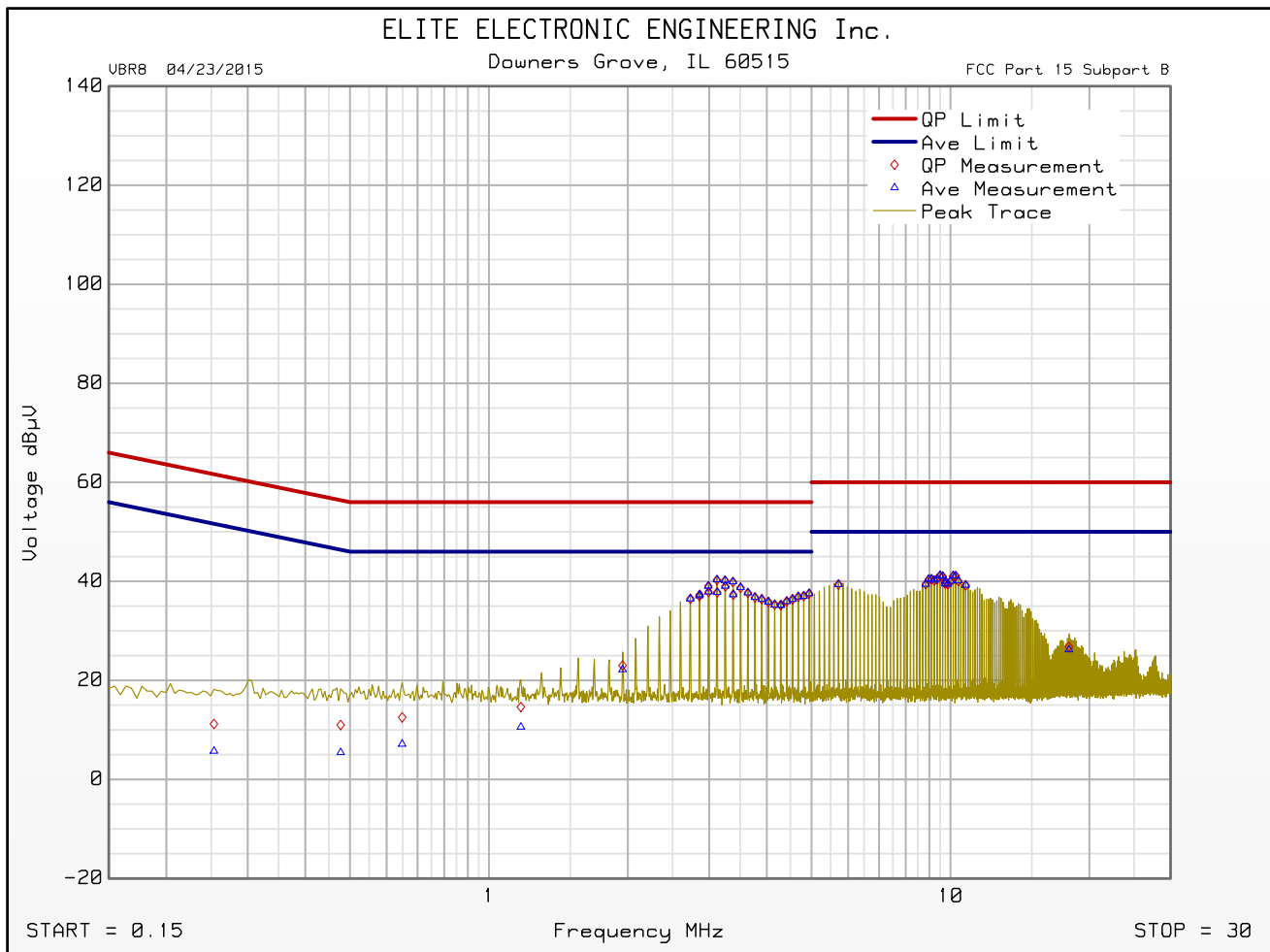
Freq MHz	Quasi-peak Level dBμV	Quasi-peak Limit dBμV	Excessive Quasi-peak Emissions	Average Level dBμV	Average Limit dBμV	Excessive Average Emissions
0.254	11.2	61.6		5.7	51.6	
0.477	11.0	56.4		5.5	46.4	
0.649	12.5	56.0		7.2	46.0	
1.173	14.6	56.0		10.6	46.0	
1.948	23.0	56.0		22.2	46.0	
2.732	36.5	56.0		36.5	46.0	
2.862	37.3	56.0		37.3	46.0	
2.988	39.0	56.0		39.1	46.0	
3.119	40.3	56.0		40.4	46.0	
3.248	40.2	56.0		40.2	46.0	
3.379	39.9	56.0		39.9	46.0	
3.509	38.7	56.0		38.8	46.0	
3.640	37.7	56.0		37.7	46.0	
3.770	36.8	56.0		36.8	46.0	
3.901	36.4	56.0		36.4	46.0	
4.549	36.4	56.0		36.4	46.0	
4.679	36.9	56.0		36.9	46.0	
4.810	37.0	56.0		37.0	46.0	
4.940	37.5	56.0		37.5	46.0	
8.969	40.4	60.0		40.4	50.0	
9.099	40.5	60.0		40.5	50.0	
9.230	40.2	60.0		40.3	50.0	
9.360	40.5	60.0		40.5	50.0	
9.491	41.1	60.0		41.2	50.0	
9.621	41.0	60.0		41.1	50.0	
9.752	40.0	60.0		40.1	50.0	
10.008	40.1	60.0		40.1	50.0	
10.139	41.1	60.0		41.2	50.0	
10.269	41.1	60.0		41.1	50.0	
10.400	40.1	60.0		40.1	50.0	
18.068	26.8	60.0		26.2	50.0	



# FCC Part 15 Subpart B Conducted Emissions Test Cumulative Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 130kHz  
Line Tested : L2  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes :  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 10:45:25 AM



Emissions Meet QP Limit  
Emissions Meet Ave Limit



## FCC Part 15 Subpart B Conducted Emissions Test Significant Emissions Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 132kHz  
Line Tested : L1  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes :  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 11:00:33 AM  
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

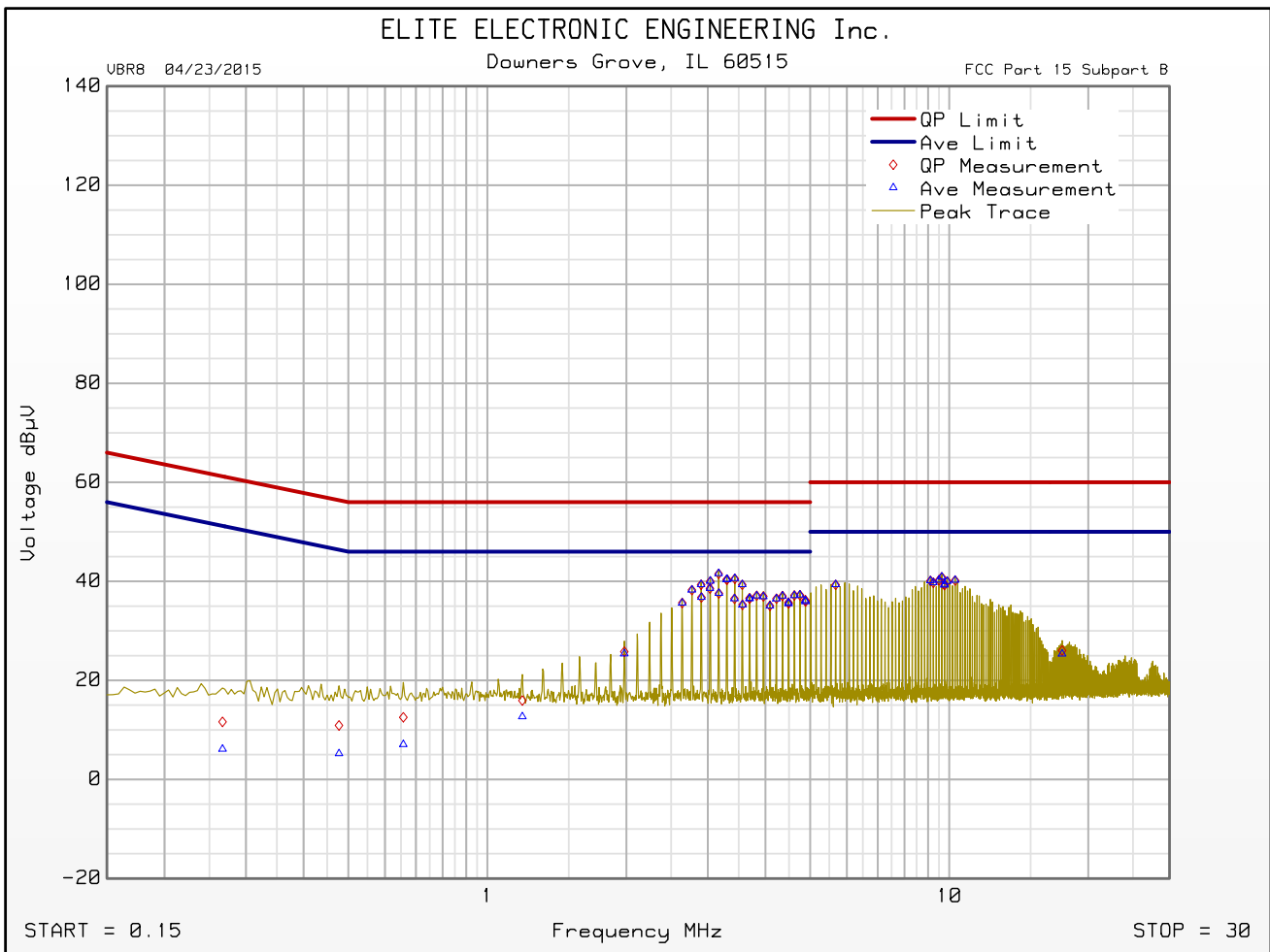
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.267	11.6	61.2		6.1	51.2	
0.477	10.9	56.4		5.2	46.4	
0.658	12.5	56.0		7.1	46.0	
1.191	15.9	56.0		12.7	46.0	
1.979	25.8	56.0		25.4	46.0	
2.772	38.2	56.0		38.3	46.0	
2.903	39.3	56.0		39.4	46.0	
3.038	40.0	56.0		40.1	46.0	
3.167	41.5	56.0		41.6	46.0	
3.302	40.4	56.0		40.5	46.0	
3.433	40.5	56.0		40.6	46.0	
3.563	39.3	56.0		39.4	46.0	
3.694	36.6	56.0		36.6	46.0	
3.829	37.1	56.0		37.1	46.0	
3.959	37.0	56.0		36.9	46.0	
4.225	36.5	56.0		36.5	46.0	
4.355	37.0	56.0		37.1	46.0	
4.621	37.2	56.0		37.2	46.0	
4.751	37.2	56.0		37.3	46.0	
4.882	36.2	56.0		36.2	46.0	
5.675	39.3	60.0		39.4	50.0	
9.108	40.1	60.0		40.2	50.0	
9.504	40.3	60.0		40.3	50.0	
9.635	40.8	60.0		40.9	50.0	
9.900	40.0	60.0		40.0	50.0	
10.296	40.2	60.0		40.3	50.0	
17.555	26.0	60.0		25.4	50.0	



# FCC Part 15 Subpart B Conducted Emissions Test Cumulative Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 132kHz  
Line Tested : L1  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes :  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 11:00:33 AM



Emissions Meet QP Limit  
Emissions Meet Ave Limit



# FCC Part 15 Subpart B Conducted Emissions Test Significant Emissions Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
 Model : ESI  
 DUT Mode : Tx @ 132kHz  
 Line Tested : L2  
 Scan Step Time [ms] : 30  
 Meas. Threshold [dB] : -10  
 Notes :  
 Test Engineer : R. King  
 Limit : Class B  
 Test Date : May 23, 2018 11:07:44 AM  
 Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

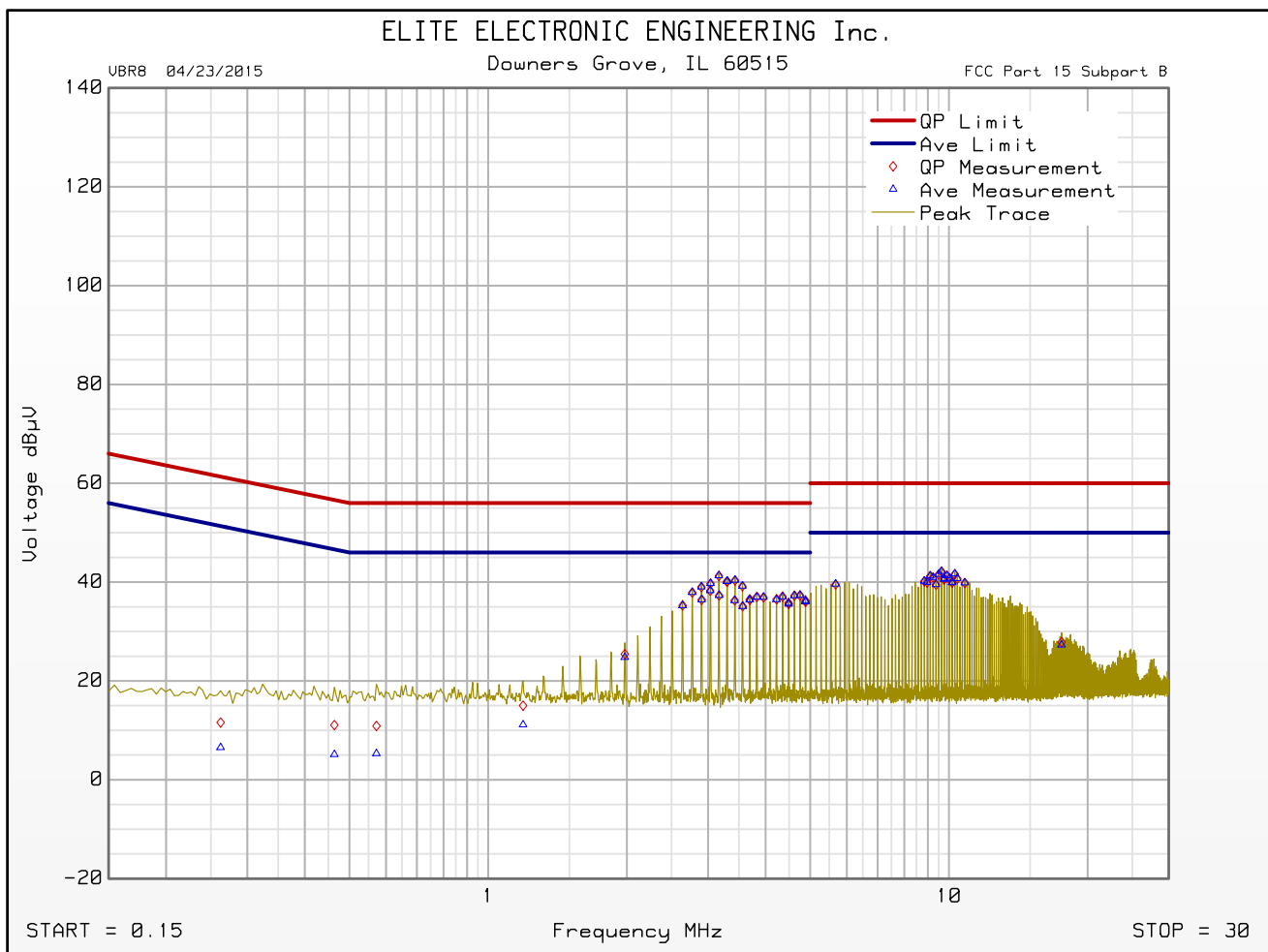
Freq MHz	Quasi-peak Level dBμV	Quasi-peak Limit dBμV	Excessive Quasi-peak Emissions	Average Level dBμV	Average Limit dBμV	Excessive Average Emissions
0.263	11.6	61.4		6.5	51.4	
0.464	11.1	56.6		5.1	46.6	
0.572	10.9	56.0		5.3	46.0	
1.191	15.0	56.0		11.1	46.0	
1.979	25.4	56.0		24.8	46.0	
2.772	37.9	56.0		37.9	46.0	
2.903	39.0	56.0		39.1	46.0	
3.038	39.7	56.0		39.8	46.0	
3.167	41.3	56.0		41.3	46.0	
3.302	40.1	56.0		40.2	46.0	
3.433	40.3	56.0		40.4	46.0	
3.563	39.2	56.0		39.2	46.0	
3.694	36.5	56.0		36.5	46.0	
3.829	37.0	56.0		37.0	46.0	
3.959	36.9	56.0		37.0	46.0	
4.225	36.5	56.0		36.5	46.0	
4.355	37.1	56.0		37.1	46.0	
4.621	37.3	56.0		37.3	46.0	
4.751	37.3	56.0		37.4	46.0	
4.882	36.3	56.0		36.3	46.0	
8.843	40.2	60.0		40.2	50.0	
9.108	41.2	60.0		41.3	50.0	
9.239	40.9	60.0		41.0	50.0	
9.504	41.6	60.0		41.6	50.0	
9.635	42.1	60.0		42.2	50.0	
9.770	40.7	60.0		40.8	50.0	
9.900	41.3	60.0		41.3	50.0	
10.031	40.7	60.0		40.8	50.0	
10.166	40.0	60.0		40.0	50.0	
10.296	41.6	60.0		41.7	50.0	
10.427	40.7	60.0		40.8	50.0	
17.555	27.9	60.0		27.3	50.0	



# FCC Part 15 Subpart B Conducted Emissions Test Cumulative Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 132kHz  
Line Tested : L2  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes :  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 11:07:44 AM



Emissions Meet QP Limit  
Emissions Meet Ave Limit



## FCC Part 15 Subpart B Conducted Emissions Test Significant Emissions Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 134kHz  
Line Tested : L1  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes :  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 10:27:36 AM  
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

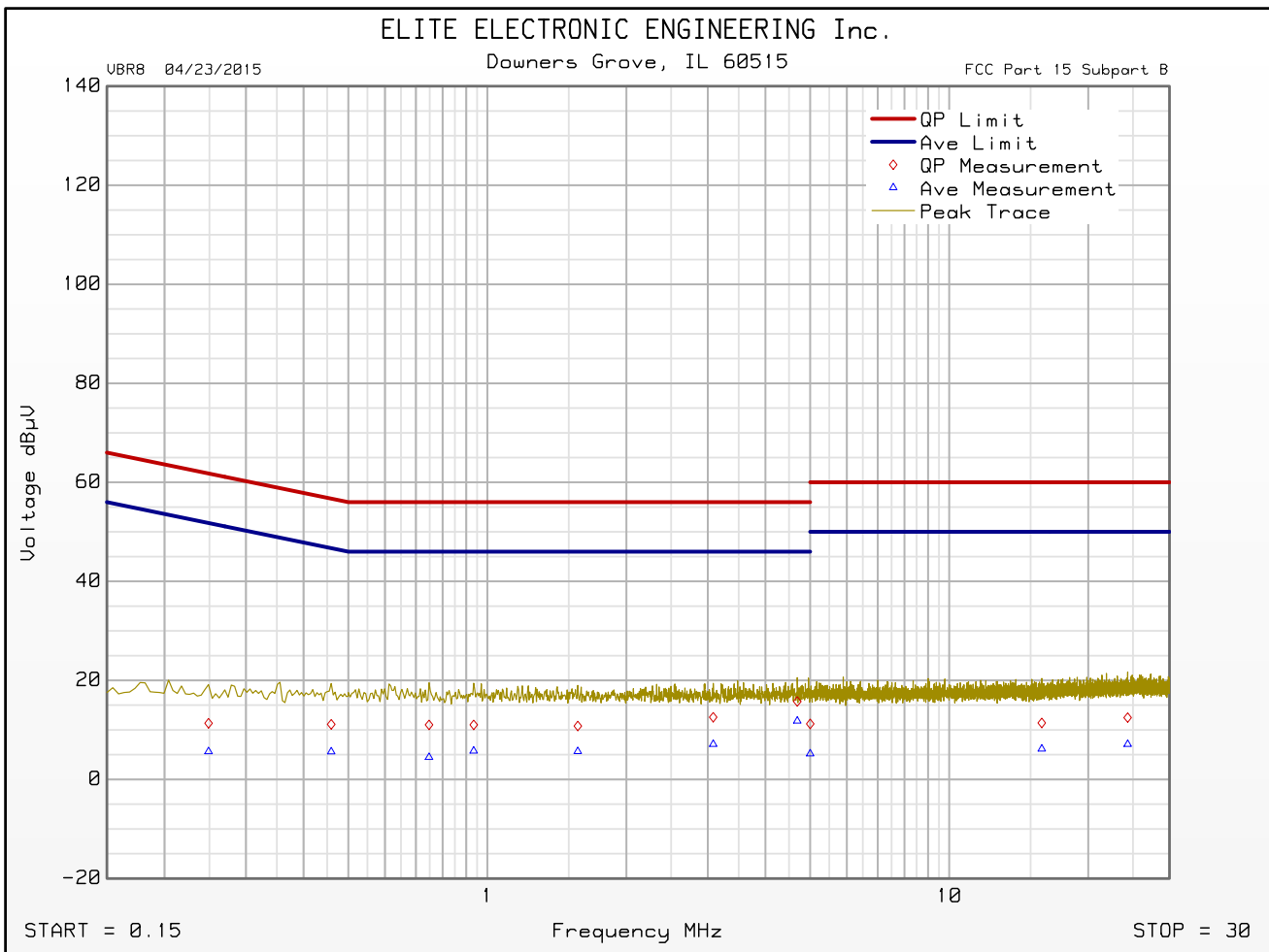
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.249	11.3	61.8		5.6	51.8	
0.459	11.1	56.7		5.6	46.7	
0.748	11.0	56.0		4.5	46.0	
0.934	11.0	56.0		5.8	46.0	
1.570	10.8	56.0		5.7	46.0	
3.083	12.6	56.0		7.1	46.0	
4.688	15.7	56.0		11.8	46.0	
5.000	11.2	56.0		5.2	46.0	
15.863	11.4	60.0		6.2	50.0	
24.346	12.5	60.0		7.1	50.0	



# FCC Part 15 Subpart B Conducted Emissions Test Cumulative Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 134kHz  
Line Tested : L1  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes : EUT operation verified during before and after test. Artifact verified.  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 10:27:36 AM



Emissions Meet QP Limit  
Emissions Meet Ave Limit





## FCC Part 15 Subpart B Conducted Emissions Test Significant Emissions Data

VBR8 04/23/2015

Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 134kHz  
Line Tested : L2  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes : EUT operation verified during before and after test. Artifact verified.  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 10:35:33 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 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
0.267	10.8	61.2		5.4	51.2	
0.468	10.9	56.5		5.3	46.5	
0.676	10.7	56.0		5.7	46.0	
0.853	11.1	56.0		4.9	46.0	
1.435	10.7	56.0		5.2	46.0	
2.282	12.1	56.0		6.5	46.0	
4.823	14.7	56.0		9.9	46.0	
5.000	11.4	56.0		5.7	46.0	
14.900	11.1	60.0		5.6	50.0	
27.109	12.7	60.0		6.9	50.0	

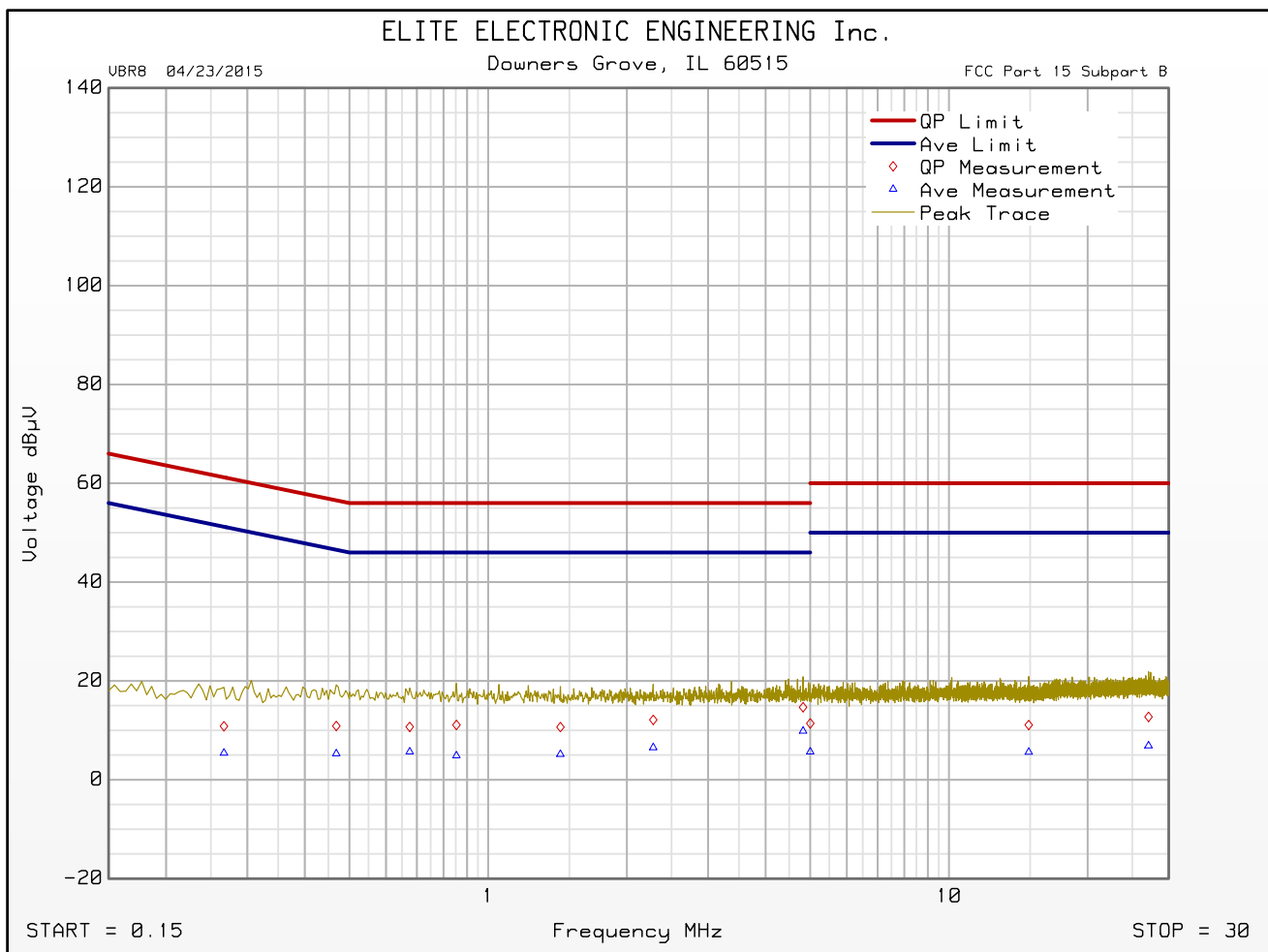


# FCC Part 15 Subpart B Conducted Emissions Test

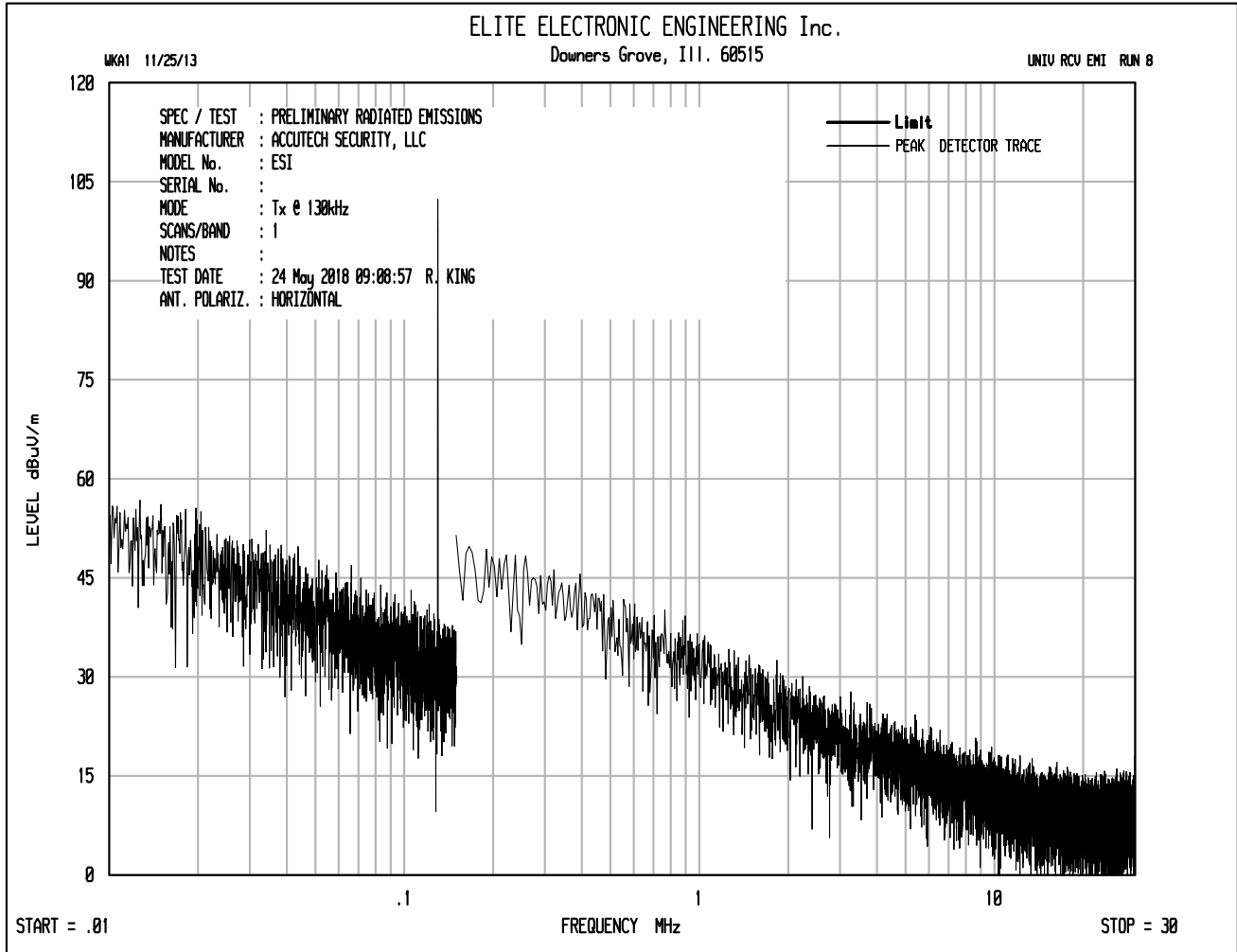
## Cumulative Data

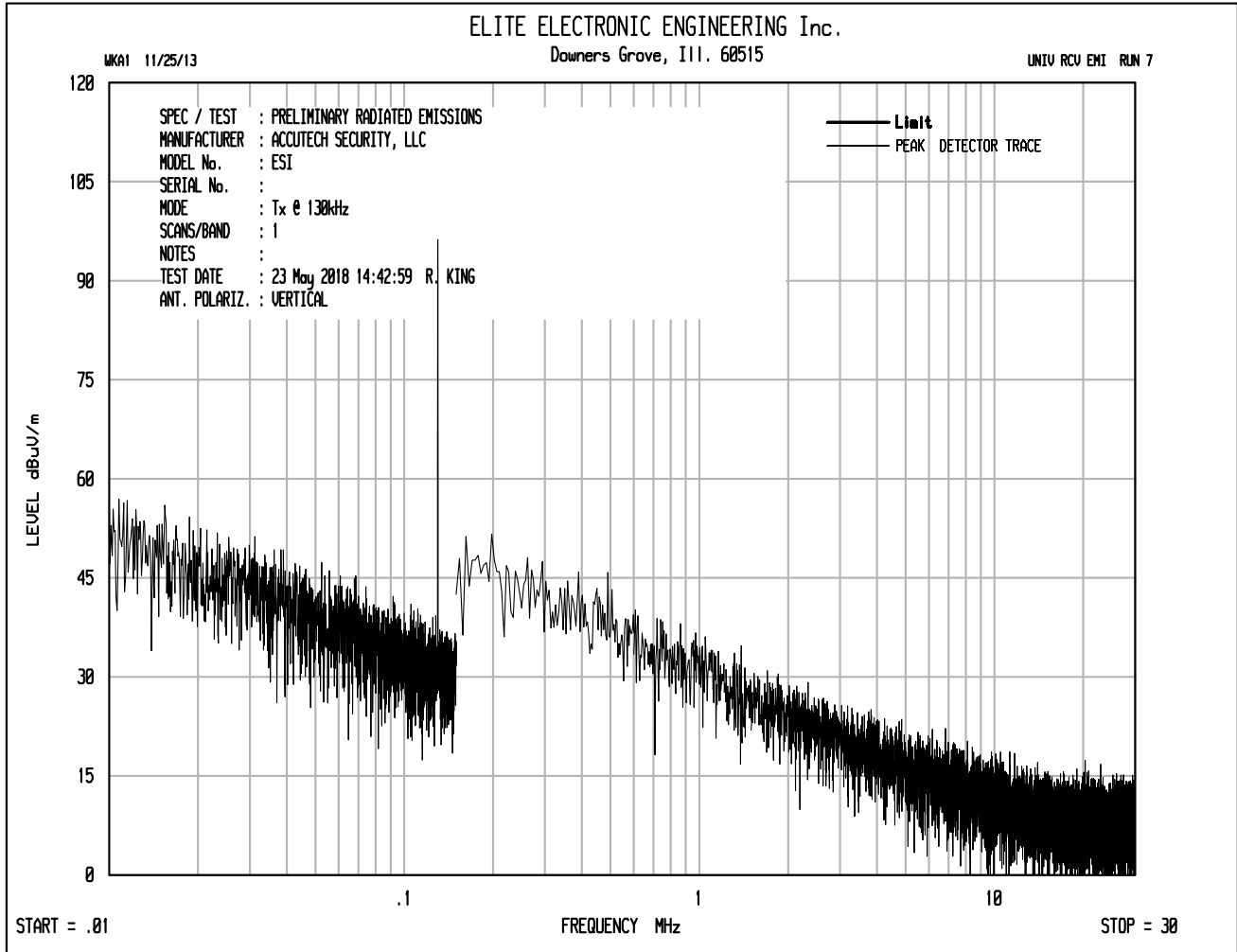
VBR8 04/23/2015

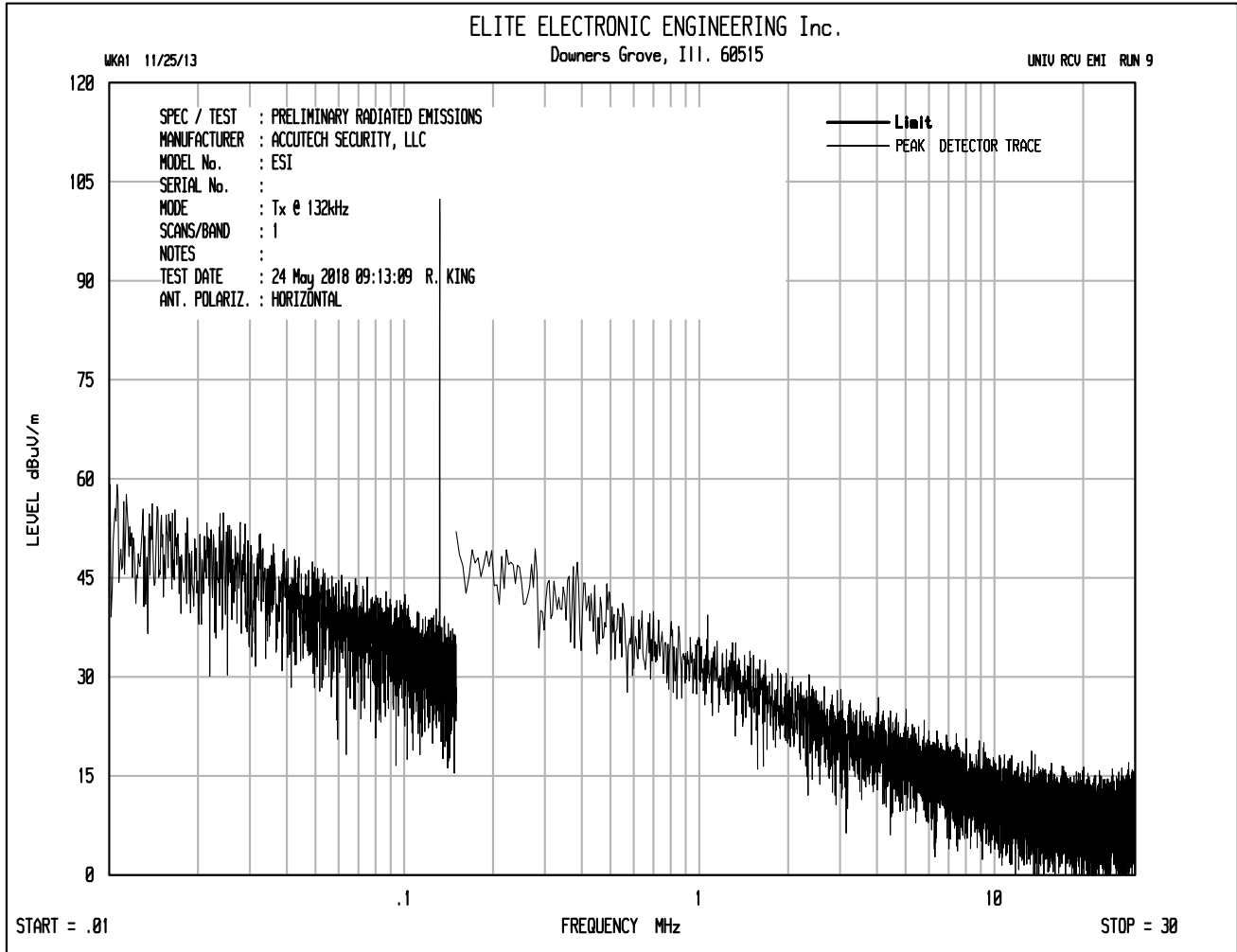
Manufacturer : ACCUTECH  
Model : ESI  
DUT Mode : Tx @ 134kHz  
Line Tested : L2  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes : EUT operation verified during before and after test. Artifact verified.  
Test Engineer : R. King  
Limit : Class B  
Test Date : May 23, 2018 10:35:33 AM

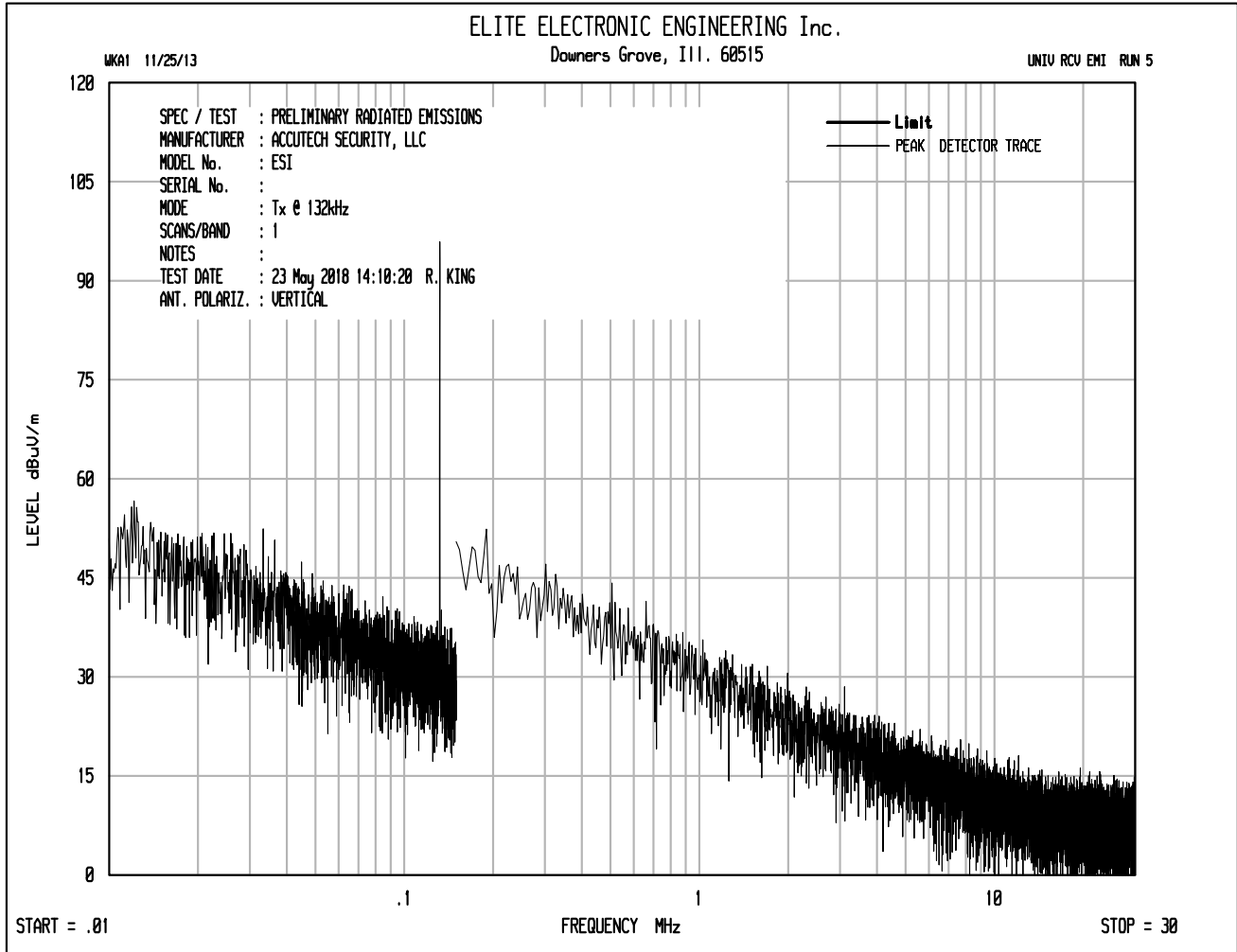


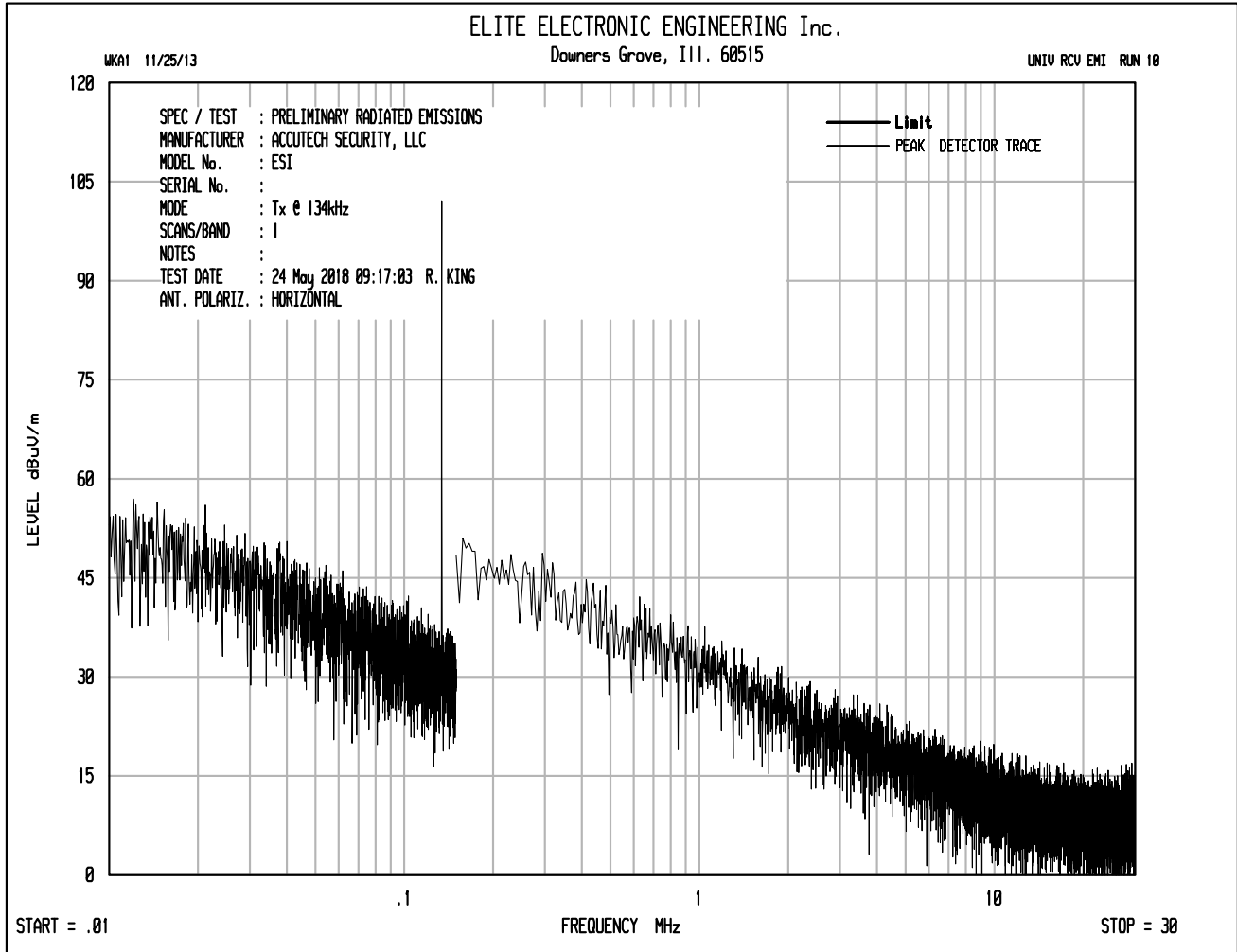
Emissions Meet QP Limit  
Emissions Meet Ave Limit

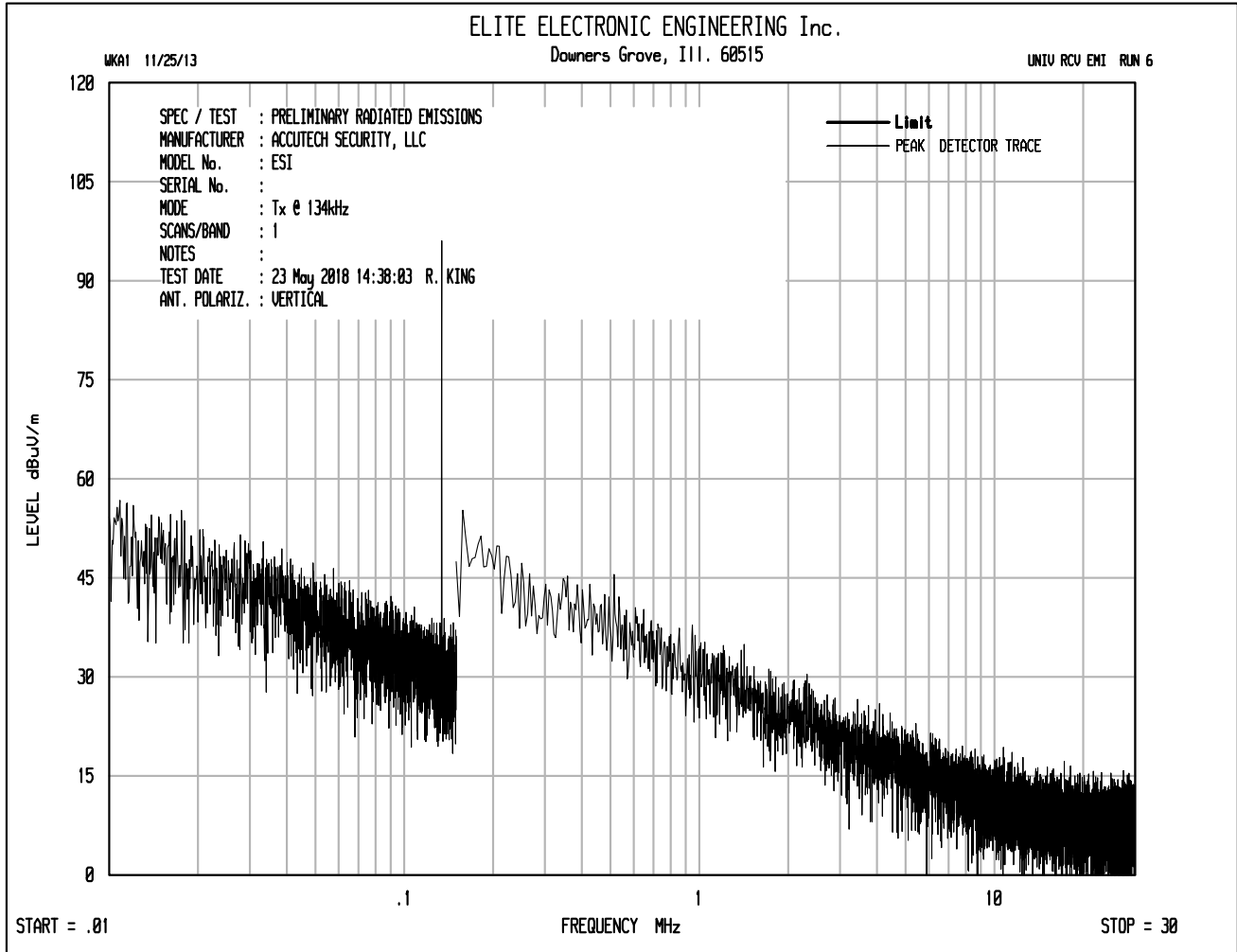
















MANUFACTURER : Accutech Security, LLC  
 MODEL NUMBER : ESI  
 SERIAL NUMBER : Prototype  
 TEST MODE : Transmit at 130kHz  
 TEST PERFORMED : FCC15C, section 15.209 Radiated Emissions  
 TEST DATE : May 23-24, 2018  
 TEST DISTANCE : 3 meters  
 NOTES : Readings below 150kHz: Peak reading with 200Hz bandwidth  
 : Readings in the 110-490 kHz band: Average readings with 9kHz bandwidth  
 : Readings above 490kHz: Quasi-Peak with 9kHz bandwidth

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Dist. Corr. (dB)	Total (dBuV/m)	Total (uV/m)	Limit (uV/m)	Specified Test Distance (meters)	Margin (dB)
0.130	H	91.3		0.0	11.0	0.0	-80.0	22.3	13.1	18.5	300.0	-3.0
0.130	V	91.1		0.0	11.0	0.0	-80.0	22.1	12.8	18.5	300.0	-3.2
0.260	H	30.7	*	0.0	11.0	0.0	-80.0	-38.4	0.0	9.2	300.0	-57.7
0.260	V	31.8	*	0.0	11.0	0.0	-80.0	-37.2	0.0	9.2	300.0	-56.5
0.390	H	27.1	*	0.0	11.0	0.0	-80.0	-41.9	0.0	6.2	300.0	-57.7
0.390	V	27.3	*	0.0	11.0	0.0	-80.0	-41.7	0.0	6.2	300.0	-57.5
0.520	H	30.0	*	0.0	11.0	0.0	-40.0	0.9	1.1	46.2	30.0	-32.4
0.520	V	30.0	*	0.0	11.0	0.0	-40.0	1.0	1.1	46.2	30.0	-32.3
0.650	H	27.8	*	0.0	11.0	0.0	-40.0	-1.2	0.9	36.9	30.0	-32.6
0.650	V	27.7	*	0.0	11.0	0.0	-40.0	-1.3	0.9	36.9	30.0	-32.6
0.780	H	26.1	*	0.0	11.0	0.0	-40.0	-2.9	0.7	30.8	30.0	-32.7
0.780	V	26.1	*	0.0	11.0	0.0	-40.0	-3.0	0.7	30.8	30.0	-32.7
0.910	H	24.4	*	0.0	11.0	0.0	-40.0	-4.7	0.6	26.4	30.0	-33.1
0.910	V	24.5	*	0.0	11.0	0.0	-40.0	-4.5	0.6	26.4	30.0	-33.0
1.040	H	23.3	*	0.0	11.0	0.0	-40.0	-5.7	0.5	23.1	30.0	-32.9
1.040	V	23.4	*	0.0	11.0	0.0	-40.0	-5.6	0.5	23.1	30.0	-32.9
1.170	H	22.0	*	0.0	11.0	0.0	-40.0	-6.9	0.5	20.5	30.0	-33.2
1.170	V	22.0	*	0.0	11.0	0.0	-40.0	-7.0	0.4	20.5	30.0	-33.2
1.300	H	21.1	*	0.0	11.0	0.0	-40.0	-7.8	0.4	18.5	30.0	-33.2
1.300	V	20.9	*	0.0	11.0	0.0	-40.0	-8.0	0.4	18.5	30.0	-33.3

Checked BY Richard E. King :

Richard E. King



MANUFACTURER : Accutech Security, LLC  
 MODEL NUMBER : ESI  
 SERIAL NUMBER : Prototype  
 TEST MODE : Transmit at 132kHz  
 TEST PERFORMED : FCC15C, section 15.209 Radiated Emissions  
 TEST DATE : May 23-24, 2018  
 TEST DISTANCE : 3 meters  
 NOTES : Readings below 150kHz: Peak reading with 200Hz bandwidth  
 : Readings in the 110-490 kHz band: Average readings with 9kHz bandwidth  
 : Readings above 490kHz: Quasi-Peak with 9kHz bandwidth

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Dist. Corr. (dB)	Total (dBuV/m)	Total (uV/m)	Limit (uV/m)	Specified Test Distance (meters)	Margin (dB)
0.132	H	91.4		0.0	11.0	0.0	-80.0	22.4	13.2	18.2	300.0	-2.8
0.132	V	85.9		0.0	11.0	0.0	-80.0	16.9	7.0	18.2	300.0	-8.3
0.264	H	30.5	*	0.0	11.0	0.0	-80.0	-38.5	0.0	9.1	300.0	-57.7
0.264	V	31.5	*	0.0	11.0	0.0	-80.0	-37.5	0.0	9.1	300.0	-56.7
0.396	H	27.0	*	0.0	11.0	0.0	-80.0	-42.0	0.0	6.1	300.0	-57.6
0.396	V	27.8	*	0.0	11.0	0.0	-80.0	-41.2	0.0	6.1	300.0	-56.9
0.528	H	29.9	*	0.0	11.0	0.0	-40.0	0.9	1.1	45.5	30.0	-32.3
0.528	V	29.9	*	0.0	11.0	0.0	-40.0	0.9	1.1	45.5	30.0	-32.3
0.660	H	27.7	*	0.0	11.0	0.0	-40.0	-1.3	0.9	36.4	30.0	-32.5
0.660	V	27.6	*	0.0	11.0	0.0	-40.0	-1.4	0.9	36.4	30.0	-32.6
0.792	H	25.9	*	0.0	11.0	0.0	-40.0	-3.1	0.7	30.3	30.0	-32.8
0.792	V	25.9	*	0.0	11.0	0.0	-40.0	-3.1	0.7	30.3	30.0	-32.8
0.924	H	24.4	*	0.0	11.0	0.0	-40.0	-4.7	0.6	26.0	30.0	-33.0
0.924	V	24.6	*	0.0	11.0	0.0	-40.0	-4.5	0.6	26.0	30.0	-32.8
1.056	H	23.1	*	0.0	11.0	0.0	-40.0	-5.9	0.5	22.7	30.0	-33.1
1.056	V	23.1	*	0.0	11.0	0.0	-40.0	-5.9	0.5	22.7	30.0	-33.0
1.188	H	22.0	*	0.0	11.0	0.0	-40.0	-7.0	0.4	20.2	30.0	-33.1
1.188	V	21.9	*	0.0	11.0	0.0	-40.0	-7.1	0.4	20.2	30.0	-33.2
1.320	H	20.9	*	0.0	11.0	0.0	-40.0	-8.0	0.4	18.2	30.0	-33.2
1.320	V	20.4	*	0.0	11.0	0.0	-40.0	-8.5	0.4	18.2	30.0	-33.7

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : Accutech Security, LLC  
 MODEL NUMBER : ESI  
 SERIAL NUMBER : Prototype  
 TEST MODE : Transmit at 134kHz  
 TEST PERFORMED : FCC15C, section 15.209 Radiated Emissions  
 TEST DATE : May 23-24, 2018  
 TEST DISTANCE : 3 meters  
 NOTES : Readings below 150kHz: Peak reading with 200Hz bandwidth  
 : Readings in the 110-490 kHz band: Average readings with 9kHz bandwidth  
 : Readings above 490kHz: Quasi-Peak with 9kHz bandwidth

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Dist. Corr. (dB)	Total (dBuV/m)	Total (uV/m)	Limit (uV/m)	Specified Test Distance (meters)	Margin (dB)
0.134	H	91.3		0.0	11.0	0.0	-80.0	22.3	13.1	17.9	300.0	-2.7
0.134	V	90.3		0.0	11.0	0.0	-80.0	21.3	11.7	17.9	300.0	-3.7
0.268	H	30.4	*	0.0	11.0	0.0	-80.0	-38.6	0.0	9.0	300.0	-57.7
0.268	V	31.6	*	0.0	11.0	0.0	-80.0	-37.4	0.0	9.0	300.0	-56.4
0.402	H	26.9	*	0.0	11.0	0.0	-80.0	-42.1	0.0	6.0	300.0	-57.7
0.402	V	27.4	*	0.0	11.0	0.0	-80.0	-41.6	0.0	6.0	300.0	-57.1
0.536	H	29.6	*	0.0	11.0	0.0	-40.0	0.6	1.1	44.8	30.0	-32.5
0.536	V	29.7	*	0.0	11.0	0.0	-40.0	0.7	1.1	44.8	30.0	-32.3
0.670	H	27.6	*	0.0	11.0	0.0	-40.0	-1.5	0.8	35.8	30.0	-32.6
0.670	V	27.5	*	0.0	11.0	0.0	-40.0	-1.5	0.8	35.8	30.0	-32.6
0.804	H	25.8	*	0.0	11.0	0.0	-40.0	-3.3	0.7	29.9	30.0	-32.8
0.804	V	25.7	*	0.0	11.0	0.0	-40.0	-3.4	0.7	29.9	30.0	-32.9
0.938	H	24.1	*	0.0	11.0	0.0	-40.0	-4.9	0.6	25.6	30.0	-33.0
0.938	V	24.2	*	0.0	11.0	0.0	-40.0	-4.8	0.6	25.6	30.0	-33.0
1.072	H	22.9	*	0.0	11.0	0.0	-40.0	-6.1	0.5	22.4	30.0	-33.1
1.072	V	23.0	*	0.0	11.0	0.0	-40.0	-6.0	0.5	22.4	30.0	-33.0
1.206	H	21.5	*	0.0	11.0	0.0	-40.0	-7.4	0.4	19.9	30.0	-33.4
1.206	V	21.7	*	0.0	11.0	0.0	-40.0	-7.2	0.4	19.9	30.0	-33.2
1.340	H	20.9	*	0.0	11.0	0.0	-40.0	-8.1	0.4	17.9	30.0	-33.1
1.340	V	20.7	*	0.0	11.0	0.0	-40.0	-8.2	0.4	17.9	30.0	-33.3

Checked BY Richard E. King :

Richard E. King