Advanced
Compliance Laboratory

6 Randolph Way
Hillsborough, NJ 08844
Tel: (908) 927 9288
Fax: (908) 927 0728

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

of

VOTE-TRAKKER
MODEL: EVC308-FF-42
FCC ID: QJZVT-EVC308-FF42

January 31, 2007

This report concerns (check one): Original grant __x__ Class II change _____
Equipment type: Low Power Intentional Radiator

Deferred grant requested per 47 CF 0.457(d)(1)(ii)? yes _____ no __x__
If yes, defer until: _____ (date)
Company agrees to notify the Commission by _____ (date)
of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? yes _____ no __x__
If no, assumed Part 15, Subpart B for unintentional radiators - the new 47 CFR [10-1-90 Edition] provision.

Report prepared for:	Avante International Technology, Inc.
Report prepared by:	Advanced Compliance Lab
Report number:	0048-061110-01

NVLAP

The test result in this report IS supported and covered by the NVLAP accreditation

Table of Contents

Report Cover Page 1

Table of Contents 2

Figures 3

1. GENERAL INFORMATION 4
- **1.1 Verification of Compliance** 4
- **1.2 Equipment Modifications** 5
- **1.3 Product Information** 6
- **1.4 Test Methodology** 6
- **1.5 Test Facility** 6
- **1.6 Test Equipment** 6
- **1.7 Statement of the Document Use** 7

2. PRODUCT LABELING 8

3. SYSTEM TEST CONFIGURATION 9
- **3.1 Justification** 9
- **3.2 Special Accessories** 9
- **3.3 Configuration of Tested System** 9

4. SYSTEM SCHEMATICS 13

5. CONDUCTED EMISSION DATA 14
- **5.1 Test Methods and Conditions** 14
- **5.2 Test Data** 14

6. RADIATED EMISSION DATA 17
- **6.1 Field Strength Calculation** 17
- **6.2 Test Methods and Conditions** 17
- **6.2 Test Data** 17
- **6.4. Occupied Bandwidth** 19

7. FREQUENCY TOLENRANCE 20

8. PHOTOS OF TESTED EUT 26

Figures

Figure 2.1 FCC ID Label.....8

Figure 2.2 Location of Label on Back of the EUT 8

Figure 3.1 Radiated Test Setup 10

Figure 3.2 Frequency Tolerance Test Setup.....11

Figure 3.3 Conducted Test Setup, ...12

Figure 4.1 EUT Schematics.....13

Figure 5.1 Line Conducted.....15

Figure 5.2 Neutral Conducted 16

Figure 6.1 Bandwidth Plot 19

EUT Photos.....27-35

1. GENERAL INFORMATION

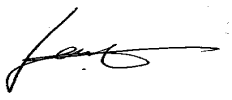
1.1 Verification of Compliance

EUT:	VOTE-TRAKKER
Model:	EVC308-FF-42
Applicant:	AVANTE INTERNATIONAL TECHNOLOGY, INC.
Test Type:	FCC Part 15C CERTIFICATION
Result:	PASS
Tested by:	ADVANCED COMPLIANCE LABORATORY
Test Date:	January 31, 2007
Report Number:	0048-061110-01

The above equipment was tested by Compliance Laboratory, Advanced Technologies, Inc. for compliance with the requirement set forth in the FCC rules and regulations Part 15 subpart C. This said equipment in the configuration described in the report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

	Prob. Dist.	Uncertainty(dB)	Uncertainty(dB)	Uncertainty(dB)
		30-1000MHz	1-6.5GHz	Conducted
Combined Std. Uncertainty u_c	norm.	±2.36	±2.99	±1.38



Wei Li
Lab Manager
Advanced Compliance Lab

Date: January 31, 2007

1.2 Equipment Modifications

The following modifications were made to this EUT in order to comply with corresponded regulation requirements and limits (see attached photos for reference)

1. Add ferrites to AC power lines, card reader and printer cable;
2. Add EMI filter to AC power line;
3. Add metal/screen casings to touch-screen controller and Motherboard;
4. Improve grounding and shielding performance by making better contacts among metal chassis and reducing the unnecessary openings.

All modifications as shown in the filing will be included in each unit marketed under the provisions of the grant. Removal or alteration of the modifications is subject to the conditions for changes described 47CFR2.1043

Approved by:

on January 31, 2007

Cynthia Chu
Executive VP
Avante Int'l Technology Inc.

1.3 Product Information

System Configuration

ITEM	DESCRIPTION	FCC ID	CABLE
Product	VOTE-TRAKKER EVC308-FF-42 (1)	QJZVT-EVC308-FF42	
Housing	Metal & Plastic		
Power Supply	115 VAC		4' AC
Operation Freq.	13.56MHz		
Device Type	Sec. 15.225 Operation		
Battery Charger	Tripp-Lite UT750UL		
DC Battery	Stowaway ST27DC180		
Thermal Printer	Seiko KPU-S347U		4' AC &3' USB
Receiver	Passive Tag	Verification	

(1) EUT submitted for grant.

1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-2003 at an antenna to EUT distance of 30 &3 meters.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated and conducted data are located at Hillsborough, New Jersey. This site has been accepted by FCC to perform measurements under Part 15 or 18 in a letter dated May 19, 1997 (Refer to: 31040/PRV 1300F2). The NVLAP Lab code for accreditation of FCC EMC Test Method is: 200101-0.

1.6 Test Equipment

Manufacture	Model	Serial No.	Description	Last Cal dd/mm/yy	Cal Due dd/mm/yy
Hewlett-Packard	HP8546A	3448A00290	EMI Receiver	01/12/06	01/12/07
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	12/02/06	12/02/07
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	09/02/06	09/02/07
Fischer Custom	LISN-2	900-4-0008	Line Impedance Stabilization Networks	15/09/06	15/09/07
Fischer Custom	LISN-2	900-4-0009	Line Impedance Stabilization Networks	23/08/06	23/08/07
EMCO	6502	2665	10KHz-30MHz Active Loop Antenna	27/02/06	27/02/07
Delta Design	5900C	0-67-26	Temperature Chamber	24/03/06	24/03/07

All Test Equipment Used are Calibrated Traceable to NIST Standards.

1.7 Statement for the Document Use

This report shall not be reproduced except in full, without the written approval of the laboratory. And this report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

2. PRODUCT LABELING

FCC ID: QJZVT-EVC308-FF42

This device complies with part 15 of the FCC Rules. Operating is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Figure 2.1 FCC ID Label

Figure 2.2 FCC ID Label Location

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it.

Testing was performed as EUT was operated continuously.

3.2 Special Accessories

N/A

3.3 Configuration of Tested System

Figure 3.1 to Figure 3.3 illustrate the system setup for testing. The RF card reader, connected via standard RS232 interface, was hosted by the LCD voting machine along with standard printer.

Figure 3.1 Radiated Test Setup

Figure 3.3 Frequency Tolerance Test Setup
(Tx device only)

Figure 3.5 Conducted Setup- Rear

4. SYSTEM SCHEMATICS

See Attachment.

Figure 4.1 System Schematics

5. CONDUCTED EMISSION DATA

5.1 Test Methods and Conditions

The EUT was under normal operational mode during the conducted emission test. EMI Receiver was scanned from 150KHz to 30MHz with maximum hold mode for maximum emission. Recorded data was sent to the plotter to generate output in linear format. At the input of the spectrum analyzer, a HP transient limiter is inserted for protective purpose. This limiter has a 10 dB attenuation in the range of 150KHZ to 30MHZ. That factor was automatically compensated by the receiver, so the readings are the corrected readings. The reference of the plot is the CISPR 22 Class B limit in Figure 5.1 through Figure 5.2.

Conducted Emission Technical Requirements				
	Class A		Class B	
Frequency Range	**Quasi-Peak dBuV**	**Average dBuV**	**Quasi-Peak DBuV**	**Average dBuV**
150kHz –0.5MHz	79 (8912uV)	66 (1995uV)	66-56	56-46
0.5MHz-30MHz	73 (4467uV)	60 (1000uV)	---	---
0.5MHz- 5MHz	---	---	56	46 (250uV)
5MHz-30MHz	---	---	60	50

Emissions that have peak values close to or over the specification limit (if any) will be also measured in the quasi-peak mode or average mode to determine compliance.

5.2 Test Data

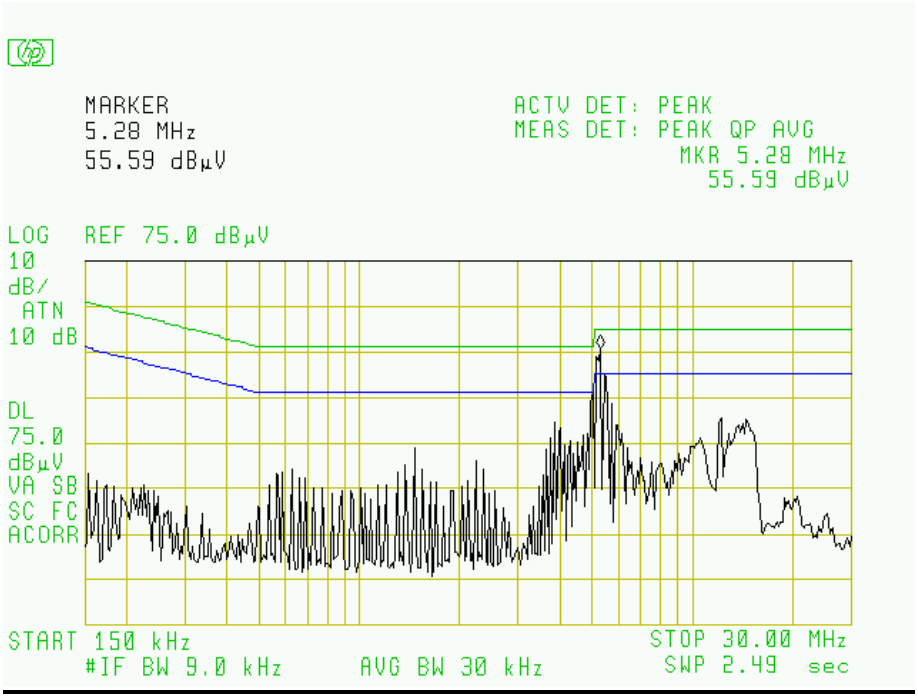
Figure 5.1-5.2 show the neutral and line conducted emissions for the standard receiving operation.

Six Highest Data for AC Line Conducted Emissions						
Frequency (KHz)	**152.5**	**152.8**	**158.0**	**200.3**	**200.6**	**268.0**
Line(L)/Neutral(N)	N	L	L	L	N	L
Peak Reading (dBuV)	63.8	60.2	54.0	58.2	58.0	42.6
Class B Limit(Quasi-Peak)	65.9	65.7	65.4	63.8	63.8	61.1
Margin (dB)	**-2.1**	**-5.5**	**-11.4**	**-5.6**	**-5.8**	**-18.5**
Average Reading (dBuV)	46.7	42.0	34.0	46.8	46.5	31.0
Class B Limit (Average)	56	55.7	55.4	53.8	53.8	51.1
Margin (dB)	**-9.3**	**-13.7**	**-21.4**	**-7.0**	**-7.3**	**-20.1**

Test Personnel:

Tester Signature: _____ Date: January 31, 2007

Typed/Printed Name: Edward Lee



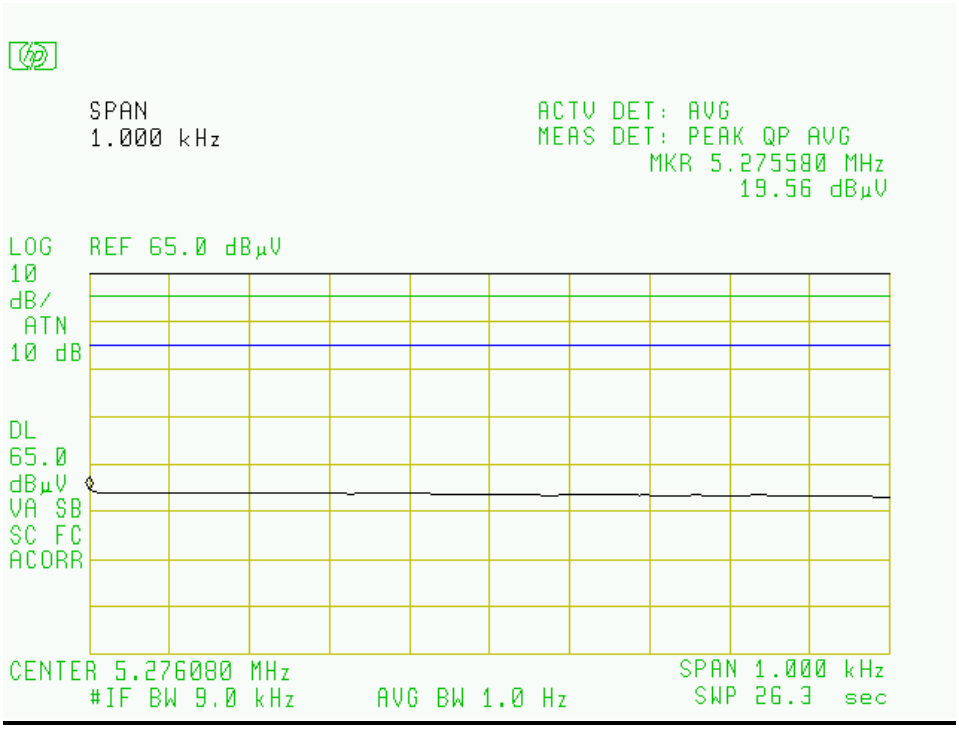
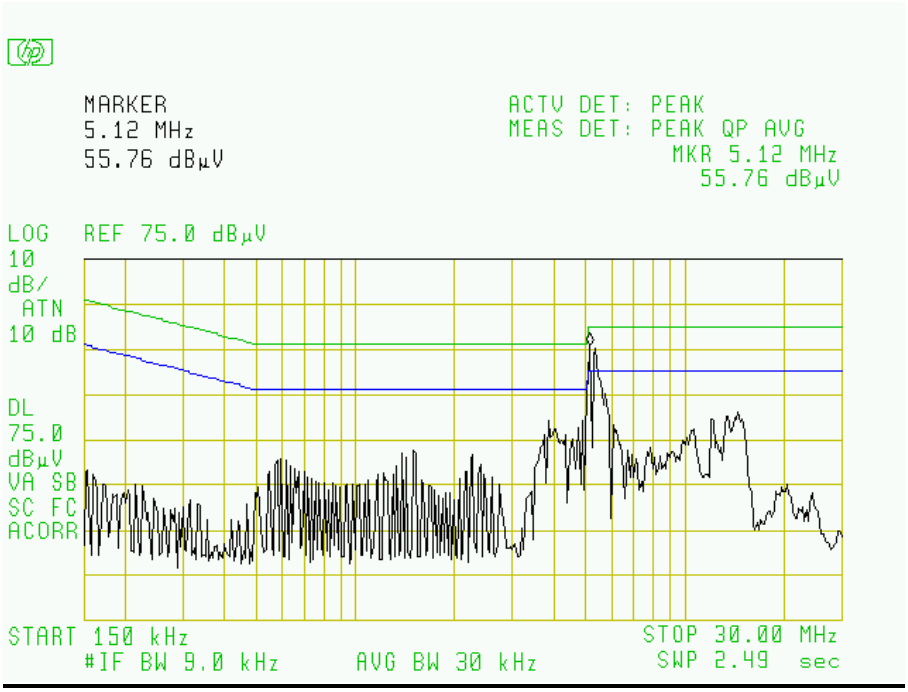


Fig. 5.1 Conducted Emission-Line



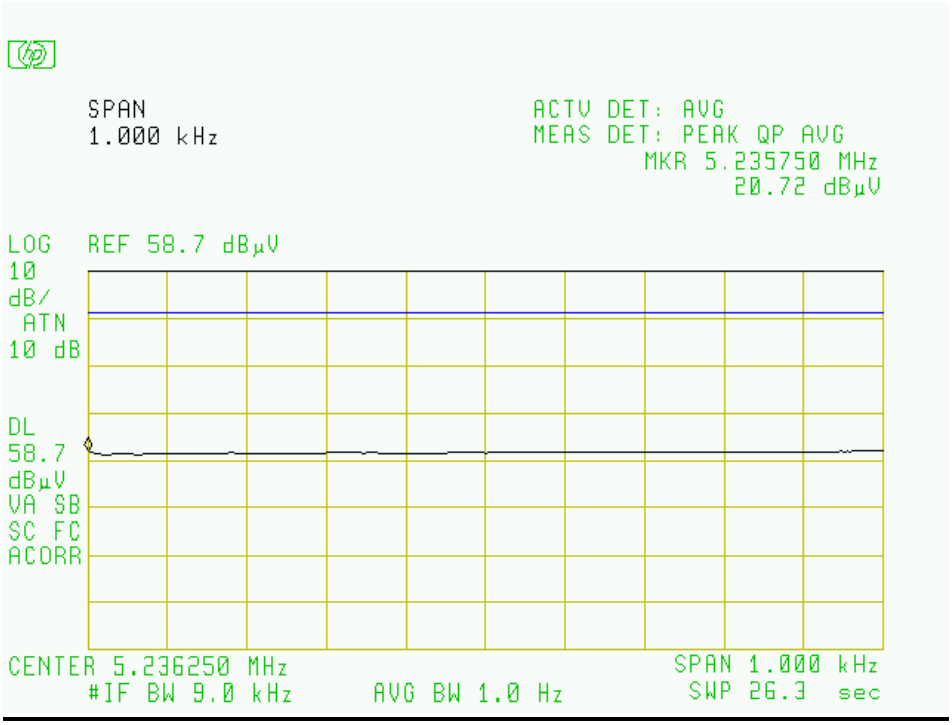


Fig. 5.2 Conducted Emission- Neutral

6. RADIATED EMISSION DATA

6.1 Field Strength Calculation

The corrected field strength is automatically calculated by EMI Receiver using following:

$$FS = RA + AF + CF + AG$$

where FS: Corrected Field Strength in dBμV/m
RA: Amplitude of EMI Receiver before correction in dBμV
AF: Antenna Factor in dB/m
CF: Cable Attenuation Factor in dB
AG: Built-in Preamplifier Gain in dB (Stored in receiver as part of the calibration data)

6.2 Test Methods and Conditions

The initial step in collecting radiated data is a EMI Receiver scan of the measurement range below 30MHz using peak/quasi-peak detector and 9KHz IF bandwidth / 30KHz video bandwidth with loop antenna. For the range 30MHz - 1GHz, 120KHz IF bandwidth / 120KHz video bandwidth are used. Both bandwidths are 1MHz for above 1GHz measurement. Up to 10^{th} harmonics were investigated.

EUT was rotated all around and cables and equipment were placed and moved within the range of positions likely to find their maximum emissions. Antenna must be rotated about its Horizontal and Vertical positions to maximize emissions.

6.3 Test Data

The following data lists the significant emission frequencies, polarity and position, peak reading of the EMI Receiver, the FCC limit, and the difference between the peak reading and the limit. Explanation of the correction and calculation are given in section 6.1.

Test Personnel: 

Typed/Printed Name: Edward Lee Date: January 31, 2007

Radiated Test Data
Operation Mode: Normal Operation

Frequency (MHz)	Polarity [H or V]	Height (m)	Azimuth (Degree)	Quasi-Peak Reading (dBμV/m)	FCC 30m &3m Limit (dBμV/m)	Difference from limit (dB)
13.56	H/V	1.2	180	39.8(3)	84.0(1)	-44.2
66.4	V	1.2	0	35.6	40.0	-4.4
77.5	V	1.2	0	36.9	40.0	-3.1
132.9	V	1.2	0	37.0	43.5	-6.5
155.0	V	1.2	45	36.0	43.5	-7.5
232.0	V	1.2	180	42.0	46.0	-4.0
300.0	V	1.2	180	41.0	46.0	-5.0
332.0	V	1.3	0	40.0	46.0	-6.0
387.5	V	1.2	180	44.5	46.0	-1.5
465.0	V	1.2	180	39.0	46.0	-7.0
542.5	V	1.2	180	44.4	46.0	-1.6
620.0	V	1.2	180	43.0	46.0	-3.0
775.0	V	1.2	180	40.1	46.0	-5.9
799.76	V	1.2	180	41.0	46.0	-5.0
66.4	H	1.2	0	35.5	40.0	-4.5
132.0	H	1.2	0	36.0	43.5	-7.5
154.8	H	1.2	0	37.2	43.5	-6.3
155.0	H	1.2	0	36.0	43.5	-7.5
199.3	H	1.2	0	40.6	43.5	-2.9
644.0	H	1.3	180	42.0	46.0	-4.0
748.2	H	1.4	160	40.3	46.0	-5.7
831.3	H	1.3	180	44.0	46.0	-2.0
914.1	H	1.3	180	43.8	46.0	-2.2

(1) Per 15.225(a): The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter (84dBuV/m) at 30 meters. No emission was observed at the second and third harmonics of the fundamental frequency.
(2) Per 15.225(d): The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in 15.209.
(3) The distance factor 19.1dB was applied to the this testing value as the measurement was adjusted from 30m to 10m distance in order to obtain the significant reading. Per FCC 15.31(d)(2) and 15.31(d) &(f-2), this factor is calculated as: $20\log((30/10)^2)=19.1$dB.

6.4 Occupied Bandwidth

Bandwidth is determined at the points 20dB down from the modulated carrier. Figure 6.1 shows the occupied bandwidth plot.

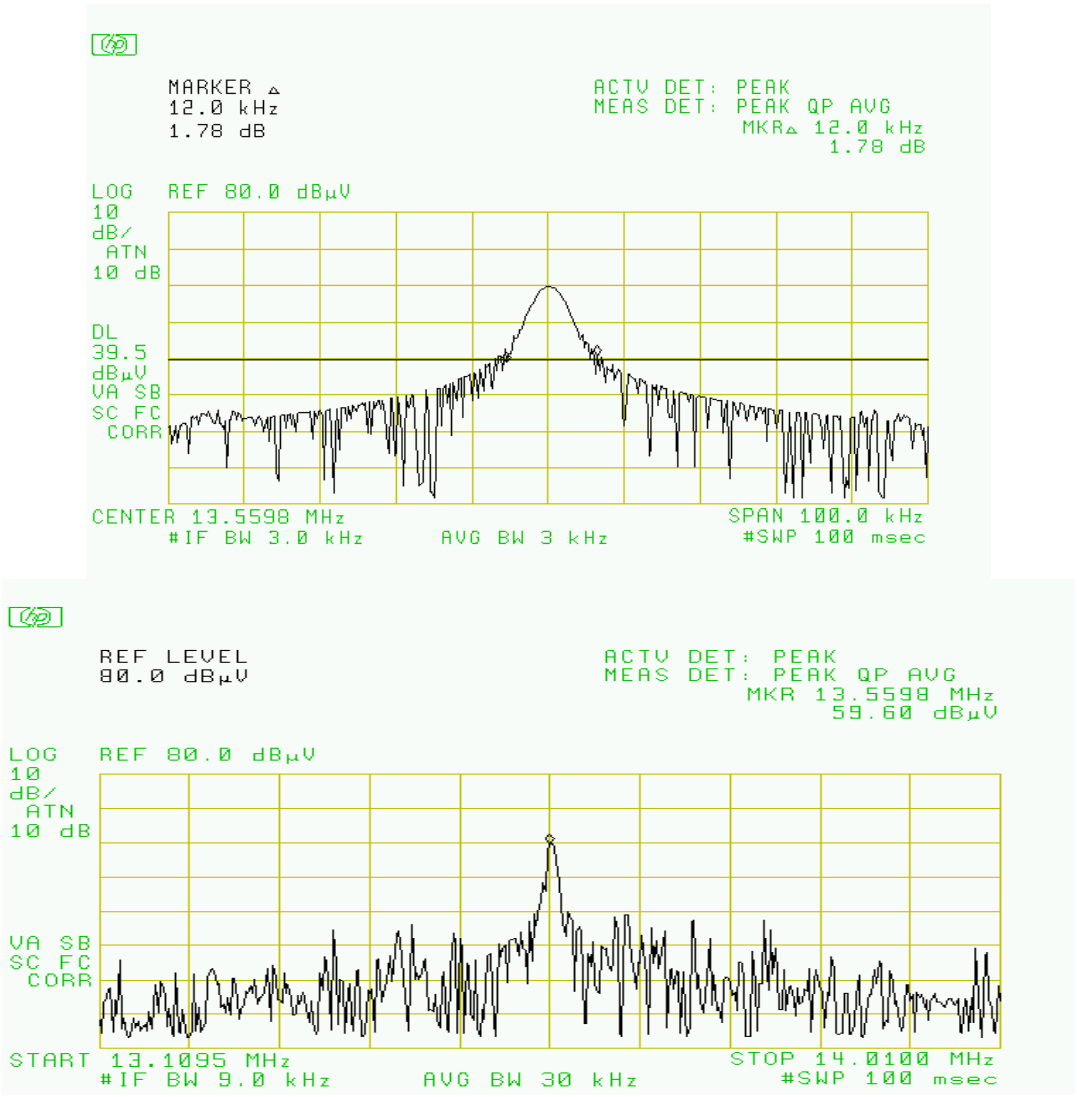


Figure 6.1 Occupied Bandwidth

7. Frequency Tolerance

Name of Test:	*Frequency Tolerance*	Test Standard:	*15.225*
Tested By:	WEI LI	Test Date:	01/10/2006

Minimum Standard:

Para 15.225(e) The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of –20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Method of Measurement:

Frequency Stability With Voltage Variation:
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. Set SA resolution bandwidth low enough (30Hz) to obtain the desired frequency resolution. (Using frequency counter method: The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10MHz ref, in of the signal generator). With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation:
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied from -20 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

Test Result: **Complies**

Test Data: See Attached Table(s)

- temperature variation: -20°C to +50°C
- voltage variation: 97.75 Vac to 132.25 Vac
- frequency tolerance: +/- 1.356 kHz (+/- 0.01%)

Frequency Stability versus Environmental Temperature

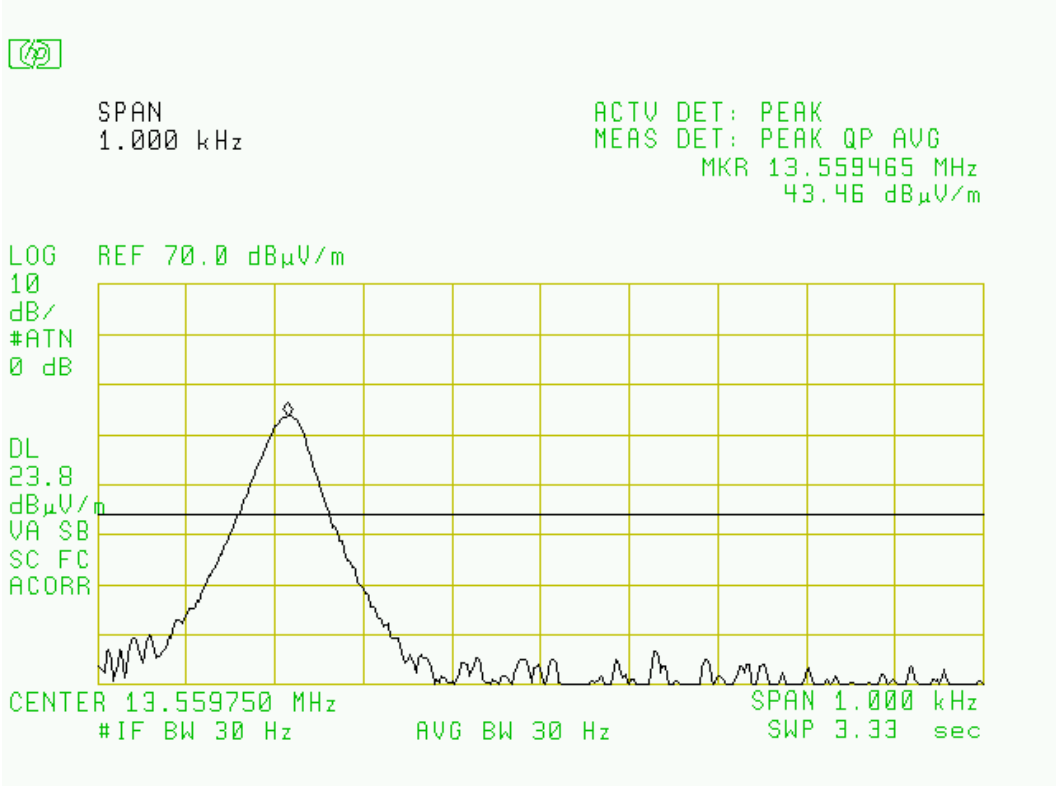
Reference Frequency @ 115V & +20°C		
Temperature & Direction (°C)	Frequency (MHz)	Deviation (Hz)
-20	13.559465	-83
+20	13.559548	-
+50	13.559600	+52

Frequency Stability versus AC Voltage

Reference Frequency @ 115VAC & +20°C		
Voltage & Direction (VAC)	Frequency (MHz)	Deviation (Hz)
97.75	13.559540	-8
115	13.559548	-
132.25	13.559545	-3

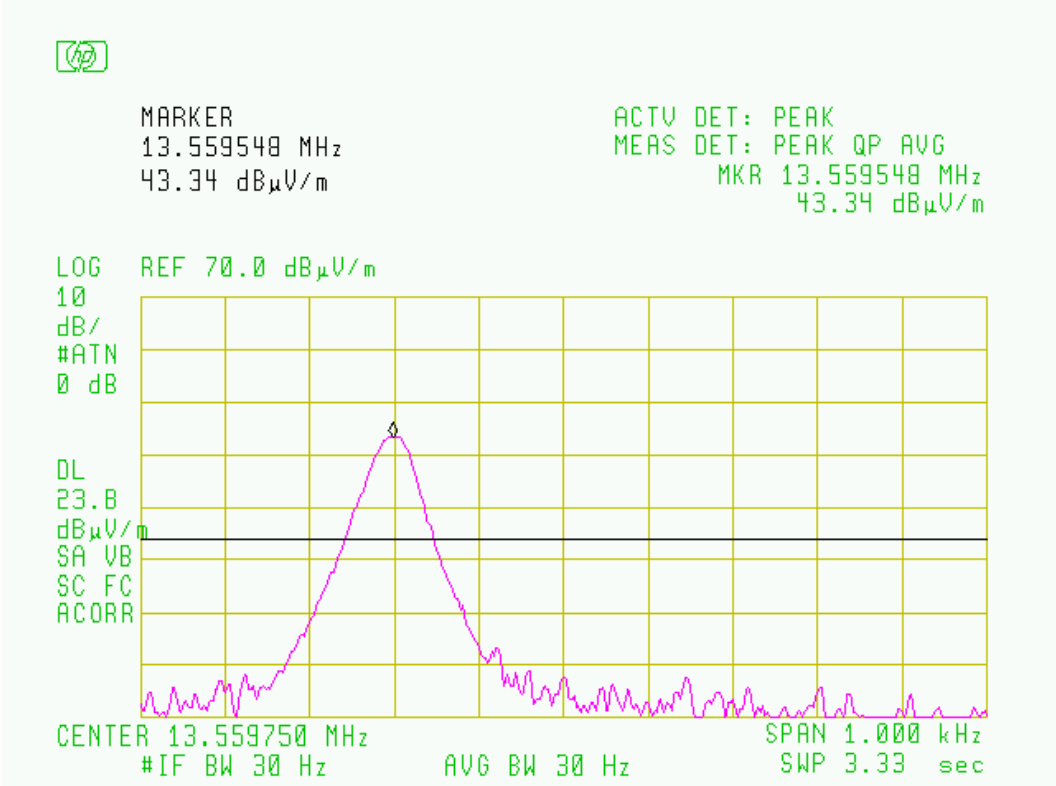
Project Number:	0048-061110-01
EUT:	Avante EVC308-FF-42
SN:	prototype
Tested By:	Edward Lee
Temperature:	70˚F
Humidity:	30%

Section:	**Frequency Tolerance**
Plot Name:	**Frequency Tolerance ~ Temperature**
Configuration:	115Vac, -20°C



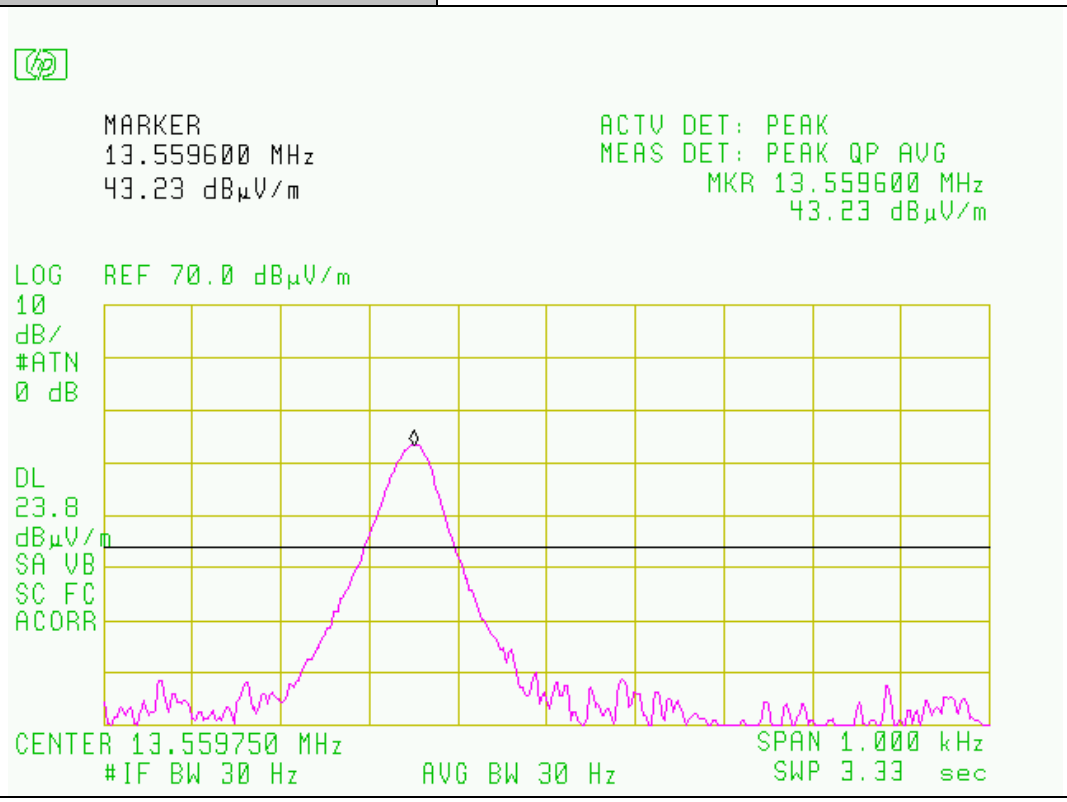
Project Number:	0048-061110-01
EUT:	Avante EVC308-FF-42
SN:	prototype
Tested By:	Edward Lee
Temperature:	70°F
Humidity:	30%

Section:	**Frequency Tolerance**
Plot Name:	**Frequency Tolerance ~ Temperature**
Configuration:	115Vac, +20°C



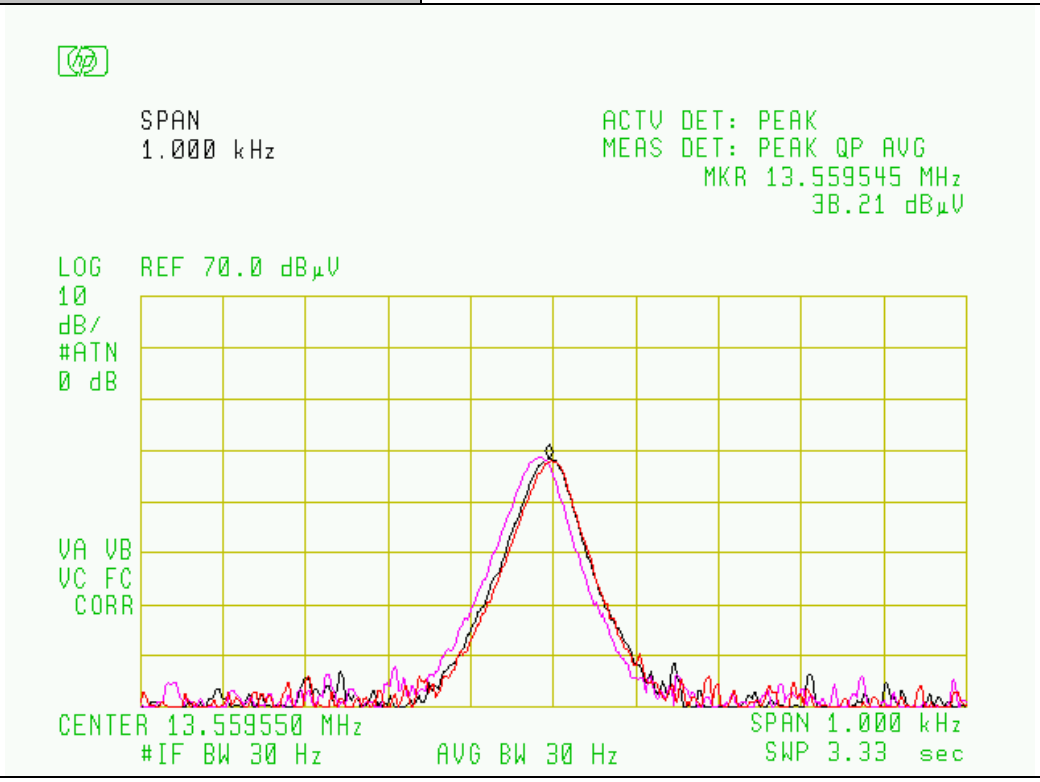
Project Number:	0048-061110-01
EUT:	Avante EVC308-FF-42
SN:	Prototype
Tested By:	Edward Lee
Temperature:	70˚F
Humidity:	30%

Section:	**Frequency Tolerance**
Plot Name:	**Frequency Tolerance ~ Temperature**
Configuration:	115Vac, +50°C



Project Number:	0048-061110-01
EUT:	Avante EVC308-FF-42
SN:	Prototype
Tested By:	Edward Lee
Temperature:	70°F
Humidity:	30%

Section:	**Frequency Tolerance**
Plot Name:	**Frequency Tolerance ~ voltage**
Configuration:	97.75Vac/115Vac/132.25Vac, +20℃



8. PHOTOS OF TESTED EUT

The following photos show the inside details of the EUT.