

**EMC QUALIFICATION  
TEST REPORT**

**DOMINION VOTING SYSTEMS, INC.**

**ASSURE 1.3 ACCUVOTE-OS MRAM MEMORY CARD,  
181-001004 REV 1**

TESTED TO CONFORM WITH:

**2005 VOLUNTARY VOTING SYSTEM GUIDELINES (VVSG)**

FOR

**Voting Systems**

Test Report Number: 120418-1784

Date of Test Completion: April 24, 2012

Manufacturer's Address: 1201 18th Street, Suite 210

Denver, CO 80202

Phone Number: 720-257-5209 ext 9221

Approved by:



Laboratory Director

**DOCUMENT REVISION HISTORY**

REVISION #	REPORT NUMBER	DESCRIPTION OF REVISION	DATE OF REVISION
0	120418-1784	ORIGINAL REPORT	2012-05-02



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Total liability is limited to the amount invoiced for the testing of this EUT and the contents of this report are not warranted.

Compliance with the appropriate governmental standards is the responsibility of the manufacturer.

Any questions regarding this report should be directed to:

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**EMC QUALIFICATION TEST REPORT**  
**ASSURE 1.3 ACCUVOTE-OS MRAM MEMORY CARD, 181-001004 REV 1**

**1.0 EXECUTIVE SUMMARY**

**1.1 PURPOSE**

The purpose of this report is to present EMC test data and demonstrate conformity to the requirements of the prescribed standards for Emissions and/or Immunity.

**1.2 CONFORMITY**

The test article was tested to the standards listed in Table I with the indicated conformity status. All test methods were performed in accordance to with the standards listed.

TABLE I. EMISSIONS CONFORMITY SUMMARY

TEST TYPE	COMPLIANCE STANDARD	TESTING TECHNIQUE	TEST DESCRIPTION	PRODUCT CLASSIFICATION	CONFORMITY STATUS
EMISSIONS	<u>FCC Part 15</u> <u>ANSI C63.4</u> <u>VVSG</u>	<input checked="" type="checkbox"/> <u>FCC Part 15</u>	Radiated Emissions	Class B	<b>PASSED</b>

**1.3 EQUIPMENT UNDER TEST (EUT)**

EUT NAME: **ASSURE 1.3 ACCUVOTE-OS MRAM MEMORY CARD**

EUT MODEL/PART NUMBER(S): **181-001004 REV 1**

REPRESENTATIVE: **DARRICK FORESTER, SLI GLOBAL SOLUTIONS, INC.**  
**303-575-6881**

**2.0 EMISSIONS TEST STANDARDS**

FCC Part 15, Subpart B

Class B

**2.1  RADIATED EMISSIONS – 30 MHZ TO 1000 MHZ**

Measurements for *Radiated Emissions* were performed over the frequency range of 30 MHz to 1000 MHz in the horizontal and vertical antenna polarities to the requirements of:

FCC Part 15, Subpart B

Class B

Testing Conditions

Date of Test: April 23, 2012  
 Temperature: 14° C  
 Relative Humidity: 48 %  
 Test Voltage: 120 VAC 60 Hz  
 Test Operator: SP

Test Location**Criterion Technology Open Area Test Site**Test DistanceAntenna Distance: **3 meter(s)** **Final Measurement(s)**Test Equipment

- Rohde and Schwarz Receiver, ESVS-30
- Hewlett-Packard Quasi-Peak Detector, HP 85650A
- Mini Circuits Pre-Amp #2
- Chase BiLog Antenna, Model CB6111

Detector: Quasi Peak  
 Resolution Bandwidth: BW = 120kHz  
 Video Bandwidth: N/A

Test Software:

OATS 5.03:  
 Main – 3.21  
 Otp – 02.00  
 Gra – 02.03

Support Equipment:

Name: AccuVote-OS unit  
 Model: Model B, MN: 79811-0400-103384-000B  
 Serial Number: 35935  
 Description: Optical scan unit with certified hardware configuration

Modifications:

Phone line cable removed, added copper tape around scanner area

Test Results of Radiated EmissionsTest Status: **PASSED**Frequency Range: **30 MHz to 1000 MHz**Minimum Margin to Limit: **-1.19** dB at **462.4243** MHzRemarks

See: **APPENDIX A** for EUT Photographs **APPENDIX B** for Data Sheets **APPENDIX D** for Test Equipment Calibration Status

**2.2**  **RADIATED EMISSIONS – 30 MHZ TO 1000 MHZ**

Measurements for *Radiated Emissions* were performed over the frequency range of 30 MHz to 1000 MHz in the horizontal and vertical antenna polarities to the requirements of:

**FCC Part 15, Subpart B****Class B**Testing Conditions

Date of Test: April 24, 2012  
Temperature: 17° C  
Relative Humidity: 45 %  
Test Voltage: 120 VAC 60 Hz  
Test Operator: SP

Test Location**Criterion Technology Open Area Test Site**Test Distance

Antenna Distance: **3 meter(s)**      **Final Measurement(s)**

Test Equipment

- Rohde and Schwarz Receiver, ESVS-30
- Hewlett-Packard Quasi-Peak Detector, HP 85650A
- Mini Circuits Pre-Amp #2
- Chase BiLog Antenna, Model CB6111

Detector: Quasi Peak  
Resolution Bandwidth: BW = 120kHz  
Video Bandwidth: N/A

Test Software:

OATS 5.03:  
Main – 3.21  
Otp – 02.00  
Gra – 02.03

Support Equipment:

Name: AccuVote-OS unit  
Model: Model D, MN: 79811-0400-103384-000D  
Serial Number: 42170  
Description: Optical scan unit with certified hardware configurat

Modifications:

Phone line cable removed, added copper tape around scanner area

Test Results of Radiated Emissions

Test Status: **PASSED**      Frequency Range: **30 MHz to 1000 MHz**

Minimum Margin to Limit: **-1.66** dB at **462.4068** MHz

Remarks

See: **APPENDIX A** for EUT Photographs    **APPENDIX B** for Data Sheets    **APPENDIX D** for Test Equipment Calibration Status

### 3.0 APPENDIX A: EUT PHOTOGRAPHS

#### 3.1 RADIATED EMISSIONS – REAR VIEW WITH SUPPORT EQUIPMENT B



3.2 RADIATED EMISSIONS – SIDE VIEW WITH SUPPORT EQUIPMENT





4.0 APPENDIX B: DATA SHEETS

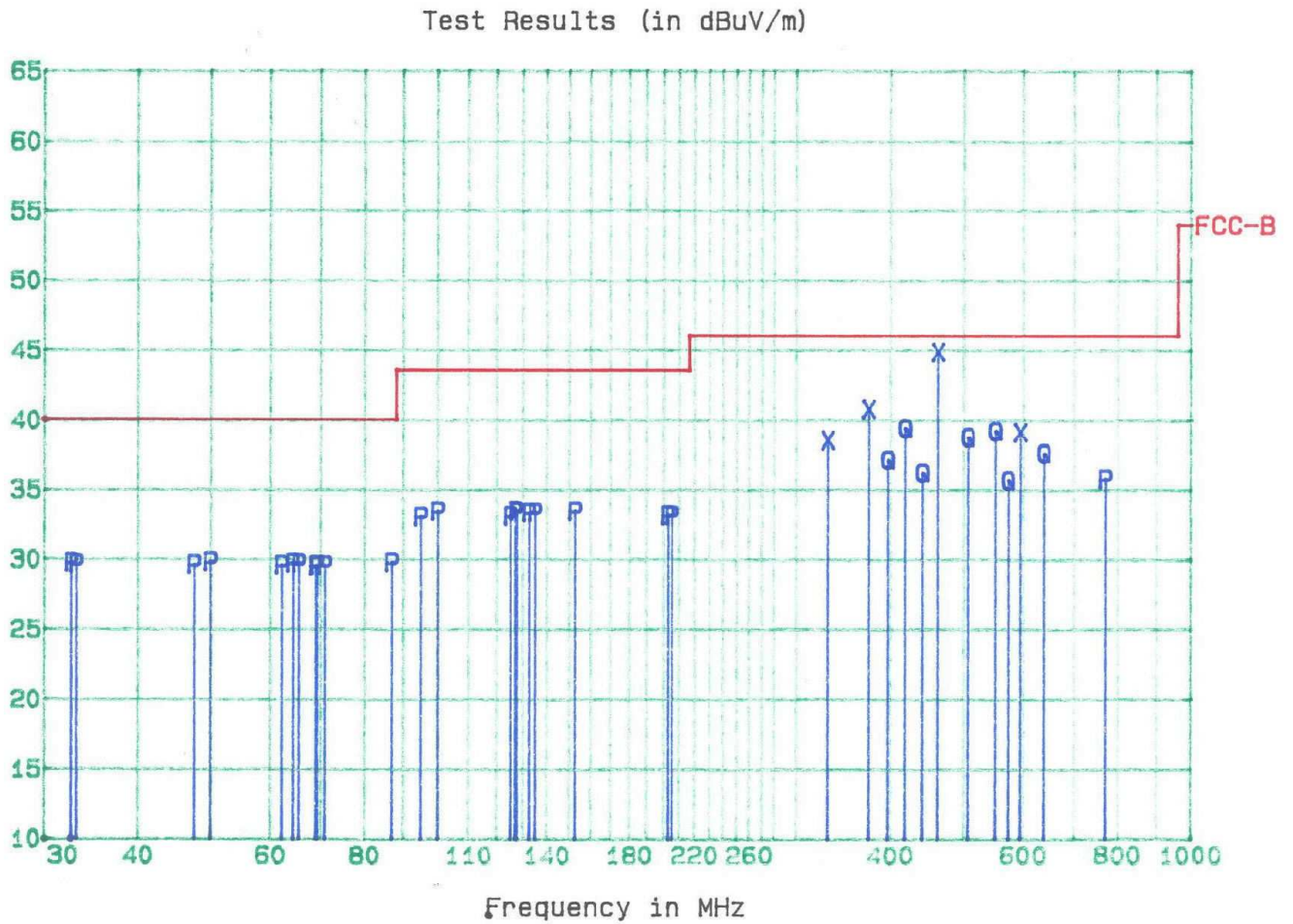
4.1 RADIATED EMISSIONS PLOT - 30 MHZ TO 1 GHZ

Criterion Technology  
EUT: Assure 1.3 AccuVote-OS MRAM Memory Card, 181-001004 Rev 1  
Manufacturer: Dominion Voting Systems  
Tester: SP  
EUT Level: table top unit, normal ops  
EUT Information: production unit using AccuVote OS model B support  
Test Information: 3m, 120 VAC 60 Hz. FCC Part 15 Class B  
Test Cond: Temp: 14 °C

Date: April 23, 2012

SpiD: 120418-1784

Humidity: 48 %



**4.2 RADIATED EMISSIONS TABLE – 30 MHZ TO 1 GHZ****Notes:**

The third column below contains alpha characters which pertain to the type of measurements made. The following are the definitions for those characters: q = Quasi Peak, m = Maximized (cable, rotation and antenna height), s = scanned but no data taken, and a = average. For the first character in column four, a '-' indicates that value is below the limit while an '\*' indicates that value is above the limit

If the list is sorted using "l-sort", then quasi-peak and average levels are weighted higher than peak levels and are moved to the front of the scan list.

The following keys help to better understand the data:

TT: Turntable position in degrees

Hght: Height of antenna in centimeters

Az: Azimuth, V = Vertical, H= Horizontal

Minimum Margin to Limit: **-1.19** dB at **462.4243** MHz

Criterion Technology Mon Apr 23 16:11:12 2012

EUT: Assure 1.3 AccuVote-OS MRAM Memory Card, 181-001004 Rev 1

Manufacturer: Dominion Voting Systems

Tester: SP

Special ID: 120418-1784

EUT Level: Table top Unit, normal ops

EUT Information: Production Unit using AccuVote-OS model B support

Test information: FCC Part 15 Class B, 3 meters, 120VAC 60Hz

**Table 1: Scan List, sorted by margin to limit FCC-B, -10.5dB filter**

<u>Freq, MHz</u>	<u>Value</u> <u>dBuV/m</u>	<u>Sts</u>	<u>Margin to FCC-B</u> <u>limits (dB)</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
462.4243	44.83	m	-1.19	71	100	V	.
374.3100	40.74	m	-5.28	0	150	V	.
418.3928	39.38	q	-6.64	0	150	V	.
550.4700	39.19	q	-6.83	90	100	V	.
594.5331	39.08	m	-6.94	17	131	V	.
506.4058	38.74	q	-7.28	0	101	V	.
330.2519	38.51	m	-7.51	0	150	V	.
638.5198	37.60	q	-8.42	180	100	V	.
396.3156	37.13	q	-8.89	0	150	V	.
440.4028	36.19	q	-9.83	0	101	V	.
572.5498	35.65	q	-10.37	180	100	V	.
126.9332	33.47	p	-10.05	180	200	H	.
152.5742	33.45	p	-10.07	180	250	H	.
127.5304	33.44	p	-10.08	180	150	H	.
100.0545	33.43	p	-10.09	180	200	V	.
135.0300	33.36	p	-10.16	270	100	V	.
132.5168	33.35	p	-10.17	180	250	H	.
49.8973	29.81	p	-10.19	0	200	V	.
86.9376	29.77	p	-10.23	180	200	H	.
32.5928	29.76	p	-10.24	270	100	V	.
770.6914	35.76	p	-10.26	0	200	V	.
64.2606	29.73	p	-10.27	270	100	V	.
65.4959	29.70	p	-10.30	0	200	V	.
33.1232	29.66	p	-10.34	0	101	V	.
202.5644	33.17	p	-10.35	270	250	H	.
205.1000	33.17	p	-10.35	270	200	H	.
47.5358	29.62	p	-10.38	270	200	V	.
125.0017	33.11	p	-10.41	180	150	V	.

69.2200	29.58	p	-10.42	0	101	H	.
70.8282	29.58	p	-10.42	0	150	V	.
62.1166	29.57	p	-10.43	180	100	V	.
95.0487	33.05	p	-10.47	0	250	H	.
68.9253	29.52	p	-10.48	90	100	V	.

Table 2: Scan List for FCC-B, sorted by Frequency, -10.5dB filter

<u>Freq. MHz</u>	<u>Final Value</u> <u>dBuV/m</u>	<u>Sts</u>	<u>Margin to FCC-B</u> <u>limits (dB)</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
32.5928	29.76	p	-10.24	270	100	V	.
33.1232	29.66	p	-10.34	0	101	V	.
47.5358	29.62	p	-10.38	270	200	V	.
49.8973	29.81	p	-10.19	0	200	V	.
62.1166	29.57	p	-10.43	180	100	V	.
64.2606	29.73	p	-10.27	270	100	V	.
65.4959	29.70	p	-10.30	0	200	V	.
68.9253	29.52	p	-10.48	90	100	V	.
69.2200	29.58	p	-10.42	0	101	H	.
70.8282	29.58	p	-10.42	0	150	V	.
86.9376	29.77	p	-10.23	180	200	H	.
95.0487	33.05	p	-10.47	0	250	H	.
100.0545	33.43	p	-10.09	180	200	V	.
125.0017	33.11	p	-10.41	180	150	V	.
126.9332	33.47	p	-10.05	180	200	H	.
127.5304	33.44	p	-10.08	180	150	H	.
132.5168	33.35	p	-10.17	180	250	H	.
135.0300	33.36	p	-10.16	270	100	V	.
152.5742	33.45	p	-10.07	180	250	H	.
202.5644	33.17	p	-10.35	270	250	H	.
205.1000	33.17	p	-10.35	270	200	H	.
330.2519	38.51	m	-7.51	0	150	V	.
374.3100	40.74	m	-5.28	0	150	V	.
396.3156	37.13	q	-8.89	0	150	V	.
418.3928	39.38	q	-6.64	0	150	V	.
440.4028	36.19	q	-9.83	0	101	V	.
462.4243	44.83	m	-1.19	71	100	V	.
506.4058	38.74	q	-7.28	0	101	V	.
550.4700	39.19	q	-6.83	90	100	V	.
572.5498	35.65	q	-10.37	180	100	V	.
594.5331	39.08	m	-6.94	17	131	V	.
638.5198	37.60	q	-8.42	180	100	V	.
770.6914	35.76	p	-10.26	0	200	V	.

Table 3: Complete Scan List Sorted by Frequency

Freq, MHz	I-val before xducer factors dBuV	Final value dBuV/m	Sts	TT	Hght	Az	Time	Comment
30.2040	32.24	27.48	p	0	200	H	Mon Apr 23 11:55:47 2012	.
31.8840	34.27	29.03	p	270	250	H	Mon Apr 23 14:26:54 2012	.
32.5310	22.46	17.01	m	26	100	V	Mon Apr 23 15:43:31 2012	.
32.5928	35.24	29.76	p	270	100	V	Mon Apr 23 14:44:34 2012	.
33.1232	35.39	29.66	p	0	101	V	Mon Apr 23 11:16:47 2012	.
33.7968	33.70	27.65	p	0	200	H	Mon Apr 23 11:55:52 2012	.
46.9290	41.58	28.95	p	270	250	H	Mon Apr 23 14:26:32 2012	.
47.5358	42.52	29.62	p	270	200	V	Mon Apr 23 14:31:06 2012	.
48.1515	41.93	28.75	p	270	200	H	Mon Apr 23 14:33:56 2012	.
48.7308	42.32	28.88	p	0	250	H	Mon Apr 23 12:06:15 2012	.
49.8973	43.82	29.81	p	0	200	V	Mon Apr 23 11:59:40 2012	.
50.0405	42.86	28.77	p	180	100	V	Mon Apr 23 13:53:03 2012	.
57.4956	44.77	28.81	p	270	100	V	Mon Apr 23 14:44:52 2012	.
61.9257	44.59	28.36	p	0	250	H	Mon Apr 23 12:06:18 2012	.
62.1166	45.80	29.57	p	180	100	V	Mon Apr 23 13:51:54 2012	.
62.5344	45.23	29.01	p	0	101	V	Mon Apr 23 11:48:21 2012	.
63.7916	45.34	29.15	p	180	250	H	Mon Apr 23 14:23:48 2012	.
64.2606	45.88	29.73	p	270	100	V	Mon Apr 23 14:44:50 2012	.
65.0544	44.49	28.42	p	0	150	V	Mon Apr 23 11:50:20 2012	.
65.4959	45.72	29.70	p	0	200	V	Mon Apr 23 12:00:04 2012	.
68.4327	45.13	29.26	p	270	200	V	Mon Apr 23 14:31:59 2012	.
68.6760	37.44	21.58	m	275	147	V	Mon Apr 23 15:39:41 2012	.
68.9253	45.37	29.52	p	90	100	V	Mon Apr 23 13:48:30 2012	.
69.2200	45.41	29.58	p	0	101	H	Mon Apr 23 11:30:33 2012	.
69.4015	44.42	28.60	p	0	250	H	Mon Apr 23 12:06:29 2012	.
70.0427	36.13	20.34	m	355	101	V	Mon Apr 23 15:53:28 2012	.
70.5054	44.24	28.48	p	90	150	H	Mon Apr 23 13:42:51 2012	.
70.8282	45.32	29.58	p	0	150	V	Mon Apr 23 11:50:28 2012	.
76.9231	43.91	28.71	p	180	200	V	Mon Apr 23 14:21:07 2012	.
84.4000	29.21	15.33	m	17	195	V	Mon Apr 23 15:49:19 2012	.
86.9376	43.42	29.77	p	180	200	H	Mon Apr 23 14:16:22 2012	.
88.0919	46.28	32.80	p	180	250	H	Mon Apr 23 14:23:50 2012	.
92.7466	44.19	31.32	p	180	250	H	Mon Apr 23 14:23:53 2012	.
95.0487	45.60	33.05	p	0	250	H	Mon Apr 23 12:06:38 2012	.
95.6474	45.26	32.80	p	0	101	V	Mon Apr 23 11:16:26 2012	.
100.0545	45.11	33.43	p	180	200	V	Mon Apr 23 14:19:18 2012	.
122.5415	41.66	31.99	p	180	150	V	Mon Apr 23 14:04:14 2012	.
125.0017	42.65	33.11	p	180	150	V	Mon Apr 23 14:04:36 2012	.
126.9332	43.07	33.47	p	180	200	H	Mon Apr 23 14:16:32 2012	.
127.1229	42.32	32.72	p	180	150	H	Mon Apr 23 14:08:24 2012	.
127.5304	43.03	33.44	p	180	150	H	Mon Apr 23 14:08:29 2012	.
132.1098	42.68	33.01	p	180	250	H	Mon Apr 23 14:23:47 2012	.
132.5168	43.02	33.35	p	180	250	H	Mon Apr 23 14:22:37 2012	.
135.0300	43.05	33.36	p	270	100	V	Mon Apr 23 14:51:24 2012	.
142.5354	42.30	32.35	p	180	100	V	Mon Apr 23 13:52:16 2012	.
152.5742	43.90	33.45	p	180	250	H	Mon Apr 23 14:24:00 2012	.
198.1794	40.32	28.83	p	270	150	V	Mon Apr 23 14:43:14 2012	.
202.5644	44.61	33.17	p	270	250	H	Mon Apr 23 14:26:59 2012	.
205.1000	44.63	33.17	p	270	200	H	Mon Apr 23 14:33:21 2012	.
220.1942	45.94	34.79	p	270	200	H	Mon Apr 23 14:34:02 2012	.
242.1985	43.72	34.38	p	90	150	H	Mon Apr 23 13:42:37 2012	.
264.2223	37.89	29.49	p	0	101	H	Mon Apr 23 11:18:11 2012	.
286.2619	41.14	33.18	q	180	200	V	Mon Apr 23 14:20:48 2012	.
292.5900	35.03	27.26	p	90	100	H	Mon Apr 23 13:45:57 2012	.
300.0863	41.57	34.01	p	180	200	V	Mon Apr 23 14:21:36 2012	.
307.5855	39.73	32.33	p	270	200	V	Mon Apr 23 14:32:11 2012	.

308.2994	34.88	27.46	p	0	150	V	Mon Apr 23 11:50:58 2012	.
315.0901	34.30	27.00	p	0	101	V	Mon Apr 23 11:16:53 2012	.
330.2519	45.47	38.51	m	0	150	V	Mon Apr 23 11:51:02 2012	.
374.3100	46.24	40.74	m	0	150	V	Mon Apr 23 11:51:04 2012	.
396.3156	42.01	37.13	q	0	150	V	Mon Apr 23 11:51:06 2012	.
397.6043	38.19	33.39	p	0	101	V	Mon Apr 23 11:16:34 2012	.
405.1128	38.87	34.39	p	180	250	H	Mon Apr 23 14:24:15 2012	.
418.3928	43.53	39.38	q	0	150	V	Mon Apr 23 11:51:11 2012	.
440.4028	39.89	36.19	q	0	101	V	Mon Apr 23 11:47:06 2012	.
462.4243	47.95	44.83	m	71	100	V	Mon Apr 23 15:25:35 2012	.
484.4468	37.94	35.36	p	0	101	V	Mon Apr 23 11:15:11 2012	.
506.4058	40.81	38.74	q	0	101	V	Mon Apr 23 11:45:51 2012	.
550.4700	40.75	39.19	q	90	100	V	Mon Apr 23 13:46:46 2012	.
572.5498	36.27	35.65	q	180	100	V	Mon Apr 23 13:52:01 2012	.
594.5331	39.84	39.08	m	17	131	V	Mon Apr 23 15:18:19 2012	.
616.5900	35.28	35.19	p	270	200	V	Mon Apr 23 14:31:20 2012	.
638.5198	37.17	37.60	q	180	100	V	Mon Apr 23 13:51:12 2012	.
704.5318	33.82	35.46	p	0	150	V	Mon Apr 23 11:51:42 2012	.
770.6914	33.88	35.76	p	0	200	V	Mon Apr 23 12:01:38 2012	.

4.3 RADIATED EMISSIONS PLOT – 30 MHZ TO 1 GHZ

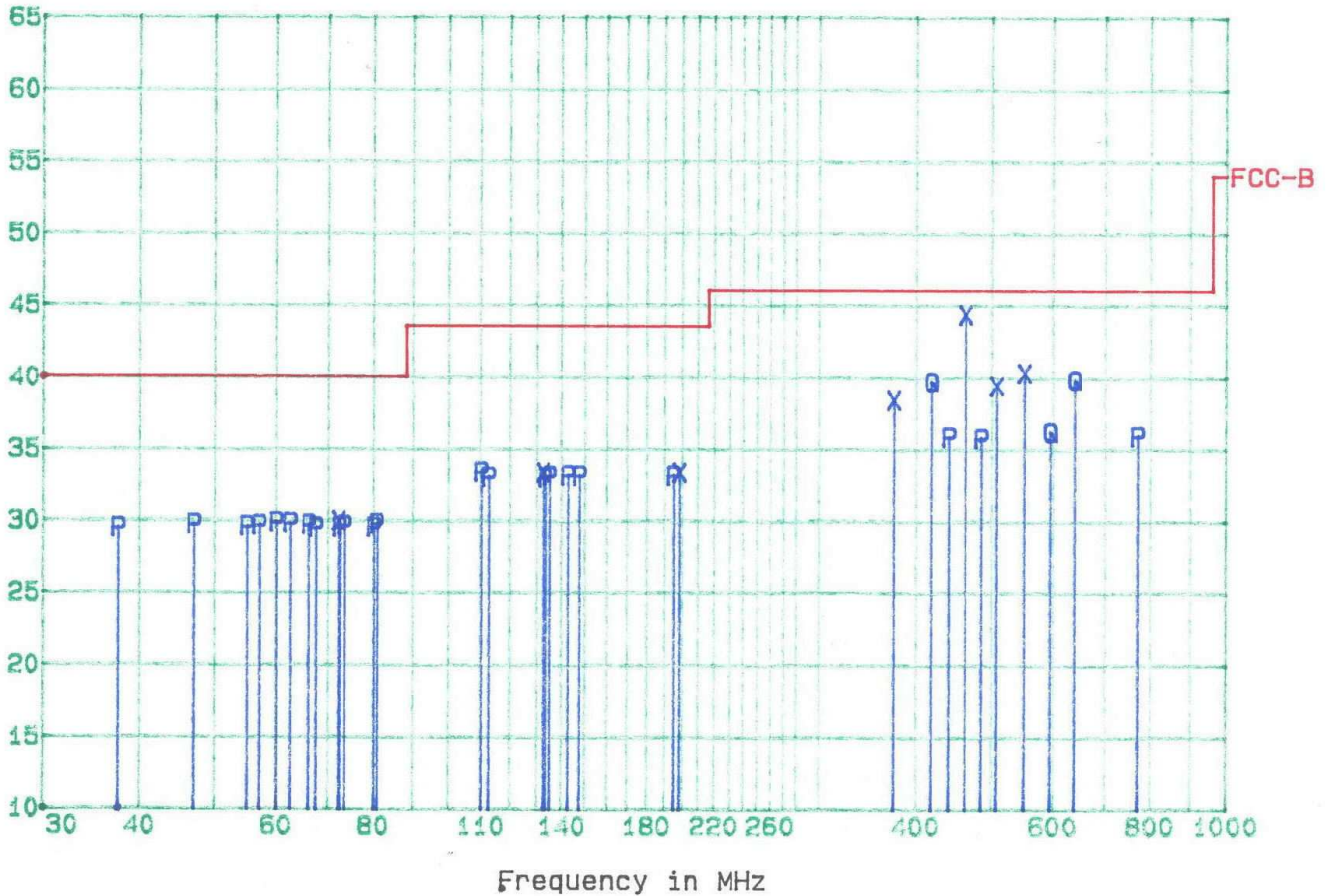
Criterion Technology  
EUT: Assure 1.3 AccuVote-OS MRAM Memory Card, 181-001004 Rev 1  
Manufacturer: Dominion Voting Systems  
Tester: SP  
EUT Level: table top unit, normal ops  
EUT Information: production unit using AccuVote OS model D support  
Test Information: 3m, 120 VAC 60 Hz. FCC Part 15 Class B  
Test Cond: Temp: 17 °C

Date: April 24, 2012

SpiD: 120418-1784

Humidity: 45 %

Test Results (in dBuV/m)



**4.4 RADIATED EMISSIONS TABLE – 30 MHZ TO 1 GHZ****Notes:**

The third column below contains alpha characters which pertain to the type of measurements made. The following are the definitions for those characters: q = Quasi Peak, m = Maximized (cable, rotation and antenna height), s = scanned but no data taken, and a = average. For the first character in column four, a '-' indicates that value is below the limit while an '\*\*' indicates that value is above the limit

If the list is sorted using "I-sort", then quasi-peak and average levels are weighted higher than peak levels and are moved to the front of the scan list.

The following keys help to better understand the data:

TT: Turntable position in degrees

Hght: Height of antenna in centimeters

Az: Azimuth, V = Vertical, H= Horizontal

Minimum Margin to Limit: **-1.66** dB at **462.4068** MHz

Criterion Technology Tue Apr 24 14:23:30 2012

EUT: Assure 1.3 AccuVote-OS MRAM Memory Card, 181-001004 Rev 1

Manufacturer: Dominion Voting Systems

Tester: SP

Special ID: 120418-1784

EUT Level: Table top Unit, normal ops

EUT Information: Production Unit using AccuVote-OS model D support

Test information: FCC Part 15 Class B, 3 meters, 120VAC 60Hz

**Table 1: Scan List, sorted by margin to limit FCC-B, -10.5dB filter**

<u>Freq. MHz</u>	<u>Value</u> <u>dBuV/m</u>	<u>Sts</u>	<u>Margin to FCC-</u> <u>B limits (dB)</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
462.4068	44.36	m	-1.66	57	100	V	.
550.5035	40.30	m	-5.72	113	100	V	.
638.5900	39.81	q	-6.21	0	150	V	.
418.3753	39.69	q	-6.33	90	150	V	.
506.4754	39.41	m	-6.61	1	100	V	.
374.3500	38.43	m	-7.59	18	100	V	.
594.5713	36.21	q	-9.81	180	100	V	.
72.1169	29.97	m	-10.03	90	100	V	.
198.1800	33.37	m	-10.15	0	100	V	.
132.5008	33.36	m	-10.16	270	100	V	.
770.6401	35.94	p	-10.08	0	200	V	.
110.1000	33.44	p	-10.08	90	150	V	.
60.0105	29.91	p	-10.09	180	150	V	.
62.5320	29.86	p	-10.14	180	200	H	.
440.3997	35.88	p	-10.14	0	100	V	.
80.7703	29.82	p	-10.18	0	200	H	.
47.0016	29.76	p	-10.24	180	250	H	.
484.4249	35.78	p	-10.24	90	100	V	.
66.0666	29.75	p	-10.25	0	150	V	.
57.0022	29.71	p	-10.29	270	100	V	.
73.3830	29.68	p	-10.32	90	150	H	.
142.5277	33.20	p	-10.32	180	100	V	.
195.0358	33.17	p	-10.35	0	150	H	.
147.5127	33.16	p	-10.36	90	150	V	.
55.0017	29.63	p	-10.37	180	150	V	.
135.0262	33.14	p	-10.38	180	250	H	.
80.0270	29.56	p	-10.44	180	150	H	.

72.3169	29.55	p	-10.45	180	250	H	.
112.5229	33.07	p	-10.45	90	150	V	.
67.5115	29.54	p	-10.46	0	150	H	.
37.5098	29.52	p	-10.48	180	200	H	.
133.1536	33.04	p	-10.48	180	250	H	.

**Table 2: Scan List for FCC-B, sorted by Frequency, -10.5dB filter**

<u>Freq. MHz</u>	<u>Final Value</u> <u>dBuV/m</u>	<u>Sts</u>	<u>Margin to FCC-</u> <u>B limits (dB)</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
37.5098	29.52	p	-10.48	180	200	H	.
47.0016	29.76	p	-10.24	180	250	H	.
55.0017	29.63	p	-10.37	180	150	V	.
57.0022	29.71	p	-10.29	270	100	V	.
60.0105	29.91	p	-10.09	180	150	V	.
62.5320	29.86	p	-10.14	180	200	H	.
66.0666	29.75	p	-10.25	0	150	V	.
67.5115	29.54	p	-10.46	0	150	H	.
72.1169	29.97	m	-10.03	90	100	V	.
72.3169	29.55	p	-10.45	180	250	H	.
73.3830	29.68	p	-10.32	90	150	H	.
80.0270	29.56	p	-10.44	180	150	H	.
80.7703	29.82	p	-10.18	0	200	H	.
110.1000	33.44	p	-10.08	90	150	V	.
112.5229	33.07	p	-10.45	90	150	V	.
132.5008	33.36	m	-10.16	270	100	V	.
133.1536	33.04	p	-10.48	180	250	H	.
135.0262	33.14	p	-10.38	180	250	H	.
142.5277	33.20	p	-10.32	180	100	V	.
147.5127	33.16	p	-10.36	90	150	V	.
195.0358	33.17	p	-10.35	0	150	H	.
198.1800	33.37	m	-10.15	0	100	V	.
374.3500	38.43	m	-7.59	18	100	V	.
418.3753	39.69	q	-6.33	90	150	V	.
440.3997	35.88	p	-10.14	0	100	V	.
462.4068	44.36	m	-1.66	57	100	V	.
484.4249	35.78	p	-10.24	90	100	V	.
506.4754	39.41	m	-6.61	1	100	V	.
550.5035	40.30	m	-5.72	113	100	V	.
594.5713	36.21	q	-9.81	180	100	V	.
638.5900	39.81	q	-6.21	0	150	V	.
770.6401	35.94	p	-10.08	0	200	V	.



Table 3: Complete Scan List Sorted by Frequency

Freq, MHz	I-val before xducr factors dBuV	Final value dBuV/m	Sts	TT	Hght	Az	Time	Comment
37.5098	37.14	29.52	p	180	200	H	Tue Apr 24 11:04:24 2012	.
47.0016	42.42	29.76	p	180	250	H	Tue Apr 24 11:06:39 2012	.
47.5289	41.75	28.85	p	270	150	V	Tue Apr 24 11:17:46 2012	.
55.0017	45.49	29.63	p	180	150	V	Tue Apr 24 10:59:53 2012	.
56.0021	43.84	27.96	p	270	250	H	Tue Apr 24 11:09:45 2012	.
57.0022	45.63	29.71	p	270	100	V	Tue Apr 24 11:23:33 2012	.
57.4899	45.45	29.49	p	90	200	V	Tue Apr 24 10:39:35 2012	.
60.0105	46.05	29.91	p	180	150	V	Tue Apr 24 10:59:34 2012	.
62.5320	46.08	29.86	p	180	200	H	Tue Apr 24 11:04:26 2012	.
66.0666	45.71	29.75	p	0	150	V	Tue Apr 24 10:09:10 2012	.
67.5115	45.43	29.54	p	0	150	H	Tue Apr 24 10:11:53 2012	.
72.1169	45.59	29.97	m	90	100	V	Tue Apr 24 10:47:47 2012	.
72.3169	45.15	29.55	p	180	250	H	Tue Apr 24 11:06:38 2012	.
73.3830	45.15	29.68	p	90	150	H	Tue Apr 24 10:44:19 2012	.
74.0861	33.62	18.21	m	270	100	V	Tue Apr 24 11:47:22 2012	.
77.5702	43.73	28.57	p	90	150	H	Tue Apr 24 10:44:24 2012	.
80.0270	44.20	29.56	p	180	150	H	Tue Apr 24 10:57:07 2012	.
80.7703	44.24	29.82	p	0	200	H	Tue Apr 24 10:13:53 2012	.
82.5139	40.92	26.84	p	270	250	H	Tue Apr 24 11:09:43 2012	.
85.0262	43.11	29.26	p	90	100	V	Tue Apr 24 10:48:04 2012	.
87.9214	41.21	27.70	p	90	100	V	Tue Apr 24 10:48:05 2012	.
110.1000	44.17	33.44	p	90	150	V	Tue Apr 24 10:42:23 2012	.
112.5229	43.43	33.07	p	90	150	V	Tue Apr 24 10:42:24 2012	.
117.2130	39.90	30.12	p	270	100	V	Tue Apr 24 11:23:35 2012	.
119.3965	40.92	31.14	p	180	100	V	Tue Apr 24 10:54:00 2012	.
120.0202	40.30	30.53	p	0	100	V	Tue Apr 24 10:07:11 2012	.
122.5490	41.85	32.18	p	180	150	V	Tue Apr 24 10:59:58 2012	.
125.0018	41.41	31.87	p	0	250	H	Tue Apr 24 10:18:44 2012	.
127.5256	42.56	32.97	p	180	200	H	Tue Apr 24 11:04:20 2012	.
132.5008	43.03	33.36	m	270	100	V	Tue Apr 24 11:22:50 2012	.
133.1536	42.71	33.04	p	180	250	H	Tue Apr 24 11:06:51 2012	.
135.0262	42.83	33.14	p	180	250	H	Tue Apr 24 11:06:21 2012	.
135.6402	42.66	32.95	p	180	200	V	Tue Apr 24 11:02:21 2012	.
140.0055	41.28	31.56	p	0	250	H	Tue Apr 24 10:18:57 2012	.
142.5277	43.15	33.20	p	180	100	V	Tue Apr 24 10:53:17 2012	.
147.5127	43.38	33.16	p	90	150	V	Tue Apr 24 10:42:37 2012	.
150.0294	41.44	31.17	p	90	100	V	Tue Apr 24 10:48:29 2012	.
154.1274	40.30	29.66	p	180	250	H	Tue Apr 24 11:07:20 2012	.
165.0301	40.91	29.42	p	180	200	V	Tue Apr 24 11:03:00 2012	.
172.5319	43.32	31.31	p	180	150	V	Tue Apr 24 10:59:59 2012	.
175.1016	42.13	29.89	p	270	250	H	Tue Apr 24 11:09:55 2012	.
176.1600	43.85	31.63	p	0	150	V	Tue Apr 24 10:10:03 2012	.
177.5609	41.41	29.30	p	270	250	H	Tue Apr 24 11:09:50 2012	.
180.0347	44.85	32.82	p	270	200	H	Tue Apr 24 11:11:38 2012	.
182.5549	44.51	32.32	p	270	200	H	Tue Apr 24 11:11:23 2012	.
185.0145	43.87	31.65	p	180	200	V	Tue Apr 24 11:02:44 2012	.
187.5330	44.41	32.21	p	180	200	V	Tue Apr 24 11:02:38 2012	.
195.0358	45.08	33.17	p	0	150	H	Tue Apr 24 10:12:35 2012	.
198.1800	44.86	33.37	m	0	100	V	Tue Apr 24 10:07:47 2012	.
202.5381	43.80	32.36	p	0	150	V	Tue Apr 24 10:10:14 2012	.
210.0386	43.65	32.13	p	270	250	H	Tue Apr 24 11:09:18 2012	.
217.5428	36.26	24.93	p	90	250	H	Tue Apr 24 10:21:50 2012	.
220.2000	42.10	30.95	p	0	100	V	Tue Apr 24 09:37:00 2012	.
232.5417	43.76	33.84	p	270	200	V	Tue Apr 24 11:14:32 2012	.
240.0435	39.23	29.76	p	270	250	H	Tue Apr 24 11:09:54 2012	.
242.2200	44.77	35.43	p	90	150	H	Tue Apr 24 10:45:07 2012	.

264.2400	36.39	27.98	p	180	250	H	Tue Apr 24 11:07:26 2012	.
277.5505	37.40	29.25	p	270	100	V	Tue Apr 24 11:23:44 2012	.
286.2600	43.44	35.48	p	0	200	V	Tue Apr 24 10:16:27 2012	.
292.5526	37.50	29.73	p	180	200	V	Tue Apr 24 11:03:07 2012	.
300.0559	36.64	29.08	p	0	150	V	Tue Apr 24 10:10:24 2012	.
307.5562	39.80	32.40	p	0	100	V	Tue Apr 24 09:40:02 2012	.
308.2800	38.94	31.52	p	0	100	V	Tue Apr 24 09:40:26 2012	.
330.3100	41.71	34.76	q	90	150	V	Tue Apr 24 10:43:11 2012	.
352.3300	41.47	35.45	p	0	100	V	Tue Apr 24 09:42:30 2012	.
374.3500	43.93	38.43	m	18	100	V	Tue Apr 24 14:05:46 2012	.
396.3700	39.82	34.95	p	270	250	H	Tue Apr 24 11:08:20 2012	.
418.3753	43.84	39.69	q	90	150	V	Tue Apr 24 10:43:22 2012	.
440.3997	39.58	35.88	p	0	100	V	Tue Apr 24 10:08:20 2012	.
462.4068	47.48	44.36	m	57	100	V	Tue Apr 24 14:02:03 2012	.
484.4249	38.36	35.78	p	90	100	V	Tue Apr 24 10:49:30 2012	.
506.4754	41.48	39.41	m	1	100	V	Tue Apr 24 13:58:03 2012	.
550.5035	41.86	40.30	m	113	100	V	Tue Apr 24 13:53:23 2012	.
594.5713	36.97	36.21	q	180	100	V	Tue Apr 24 10:53:03 2012	.
638.5900	39.38	39.81	q	0	150	V	Tue Apr 24 10:11:08 2012	.
726.7194	33.52	35.06	p	180	100	V	Tue Apr 24 10:53:32 2012	.
770.6401	34.06	35.94	p	0	200	V	Tue Apr 24 10:17:07 2012	.

---

## 5.0 APPENDIX C: PRODUCT INFORMATION FORM

### 5.1 INTRODUCTION

### 5.2 OVERVIEW

This test plan covers the EMC (Electromagnetic Compatibility) test requirements and methods for the Dominion Assure 1.3 AV-OS MRAM Memory Card, hereafter known as the Equipment Under Test (EUT), to the requirements as stated in Election Assistance Commission 2005 Voluntary Voting System Guidelines (VVSG).

### 5.3 SCOPE OF TESTING

Memory cards typically produce a low-level broadband emissions spectrum due to their randomized address and data buss signals and therefore, require radiated emissions and electromagnetic susceptibility testing. Because the memory card is “buried” within the Assure voting system and thus, rather isolated from the AC or DC power supplies, much of the power line voltage and power supply testing may be eliminated.

Because both these product variants have been fully re-qualified to the appropriate EMC standards with the current memory card and the only difference is due to the revised memory card, which is located behind a shielded metal access plate, ESD test is not required. During any ESD test, the current pulses will simply be diverted to the metal chassis before any chance of disruption to the memory card.

The appropriate EMC test:

Radiated Electromagnetic Emissions: FCC Part 15 Class B, ANSI C63.4

The new memory card contains active digital circuitry, it requires an EMC re-qualification per FCC Part 15 Rules & Regulations

The new Assure 1.3 AV-OS MRAM Memory Card will be tested as part of the AccuVote-OS units’ model B/D configuration. The device will be configured per the manufacturer documentation and placed into an operational state during hardware testing.

### 5.4 QUALIFICATIONS

The EUT supplied by Dominion Voting Systems is representative of product produced in their volume manufacturing process.

### 5.5 CLIENT

Dominion Voting  
1201 18<sup>th</sup> Street, Suite 210  
Denver, CO 80202

### 5.6 COMPANY RESTRICTED INFORMATION

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**5.7 REFERENCE DOCUMENTS**

- 1) Election Assistance Commission 2005 Voluntary Voting System Guidelines Vol I Version 1.0
- 2) Election Assistance Commission 2005 Voluntary Voting System Guidelines Vol II Version 1.0
- 3) NIST Handbook 150-22, 2008 Edition: National Voluntary Laboratory Accreditation Program – Voting System Testing. May 2008
- 4) Election Assistance Commission: NOC 07-05: Voting System Test Laboratory (VSTL) responsibilities in the management and oversight of third party testing.
- 5) Election Assistance Commission: NOC 08-001: Validity of Prior Non-Core Hardware Environmental and EMC Testing.
- 6) Election Assistance Commission: Decision on Request for Interpretation 2010-01 Voltage Levels and ESD Test
- 7) SLP-VC-20 APPROVED Engineering Change Evaluation and Reporting Rev3.3
- 8) SLI Standard Lab Procedure SLP-VC-23: Hardware Test Management
- 9) SLI Standard Lab Procedure SLP-VC-24: Subcontractor Laboratory Management
- 10) DVS ECO# ASR-001 (Signed)
- 11) SLI Evaluation\_DVS\_ECO ASR-001\_v1.1 WTSreview
- 12) SLI Global - EMC Evaluation 20111114
- 13) SLI Global - EMC Evaluation 20120405
- 14) SLI Evaluation\_DVS\_ECO ASR-001\_v1 Models B and D WTSreview

## 5.8 EMC / EMI TEST SUMMARY

Table 1: EMC / EMI Test Requirements Summary for Dominion, Assure 1.3 AV-OS MRAM Memory Card

Applicable	Test Name	Test Specification	VVSG Reference	Requirement	Comments
<b>Electromagnetic Emissions Tests</b>					
X	Radiated Electromagnetic Emissions	FCC, Part 15 ANSI C63.4	V1, 2.1.4 (c/e) V1, 4.1.2.9 V1, 4.1.7.1 V2, 4.8b	Class B	

**5.9 PRODUCT DESCRIPTION**

**Intended Use**

The EUT is intended to be used in the polling place environment.

**General**

<b>Trade Mark:</b>	Dominion Voting		
<b>Rated Input Voltage:</b>	Supporting equip (AV-OS unit, model B) uses 120Vac.	<b>Frequency:</b>	None in memory card product. Supporting equip. (AV-OS units) can generate 32.7MHz.

**Equipment Under Test**

Model No.	Part No.	Description	Qty	Revision No.
181-001004	181-001004	Assure 1.3 AccuVote-OS MRAM Memory Card, 128Kb  The new AccuVote-OS MRAM memory card is programmed with ballot and election information pertaining to the vote center once ballot layout has been completed. Election results are tallied to the memory card as ballots are counted.	2	REV 1

**Support Equipment**

Support Equipment (SE)				
Name	Model No.	Serial No.	Description	
AccuVote-OS Unit	<b>Model B</b> MN: 79811-04 00-103384-000B	35935	<b>Optical scan unit with EAC certified hardware configuration.</b>	
AccuVote-OS Unit	Model B MN: 79811-04 00-103384-000B	35930	Optical scan unit with EAC certified hardware configuration.	
AccuVote-OS Unit	<b>Model D</b> MN: 79811-04 00-103384-000D	42170	<b>Optical scan unit with EAC certified hardware configuration.</b>	
AccuVote-OS Unit	Model D MN: 79811-04 00-103384-000D	43653	Optical scan unit with EAC certified hardware configuration.	
SE I/O Cabling				
Model No.	Description	Shielded?	Length	Quantity
Belden 17250 or equivalent	AC Power Cable		6.7 FT (2m)	1

**Engineering Changes**

Engineering Change (EC)# (Related to Assure 1.2 Evaluation)	Description
ECO ASR-001 – (New AccuVote-OS Memory Card Proto4 “Pre-production Model”)	Dominion has added a new AccuVote-OS memory card product to the Assure product line.
ECO ASR-002 – (New AccuVote-OS Memory Card Proto5 “Production Model”)	Modification from Proto5 (received 12/13/11): Rework PCB with bridge across Pins 39 and 40 on J1 connector via solder side.

**Power Supplies (SE)**

Manufacturer	Model	Input	Output and Type
Dominion Voting: The AV-OS power supply is a custom design for the product. It's a switching power supply that takes in 120Vac and	N/A	120VAC	Outputs 15Vdc and 5Vdc to the reader, 15Vdc to the Motherboard, and a trickle charge to the 12Vdc SLA battery.

**Accessories**

Type	Model	Function
None		

**Oscillator Frequencies**

Frequency	Description of Use
The supporting equipment generates the following frequencies: 32.7MHz Scanner Module Clock Crystal 15MHz CPU Clock Crystal 52KHz Power Supply Switching Frequency	Memory card product uses the supporting equipment's address/data bus clock cycle frequency of 7.5MHz.

**Interconnecting Cables**

Type	Description	Shielded?	Length	Quantity
None				

**Software**

Type	Version	Description
AV-OS (support equipment)	PC 1.96.14	Precinct Count optical scan tabulator programming.

## 5.10 TEST PLAN

### Operating Modes and Configurations for EMC Testing

#### Operating Mode

The new Assure 1.3 AV-OS MRAM memory card will be tested as part of the AccuVote-OS unit configuration. The AccuVote-OS scanner Models B / D (supporting equipment) will be configured in Test Election mode, scanning a test ballot in recirculation mode and writing results to the new Assure 1.3 AV-OS MRAM memory card.

Prior to each test the zero report is printed to ensure that no votes have been counted before the start of the test. At the completion of each test, election results will be validated by reviewing the election summary reports against the public counter on the AccuVote-OS optical scanner’s LCD panel display to verify if any data was lost during testing. Reports can only be generated when a memory card is installed on the unit.

Example:

LCD panel display “Start Count = 0” (Start of test)

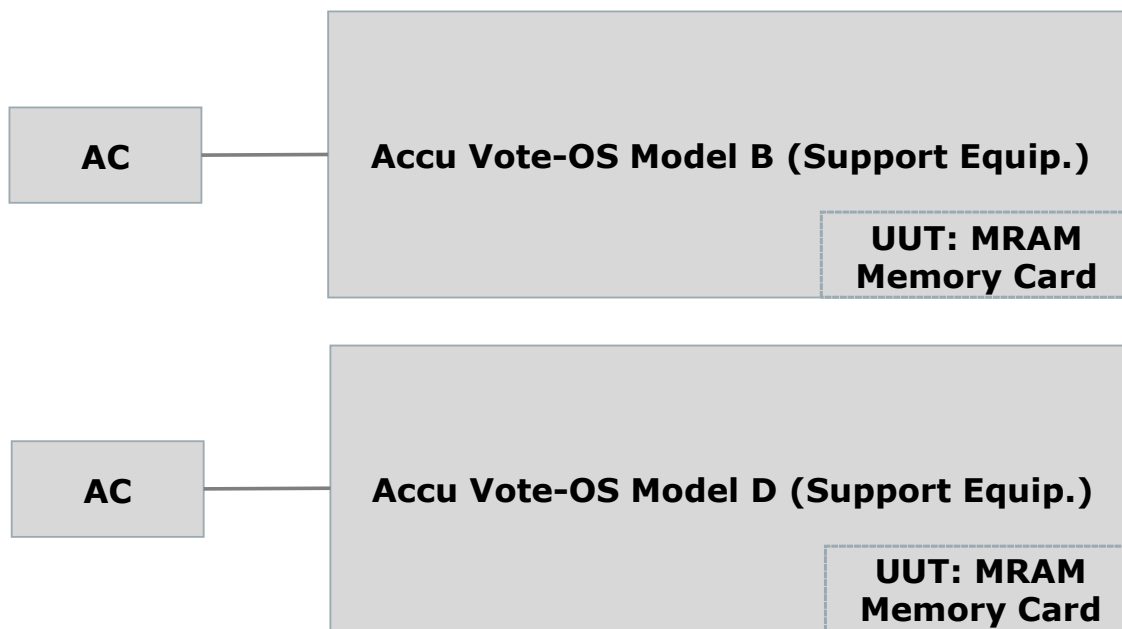
LCD panel display “Finish Count = 250” (Completion of test)

Printed Summary Report – “Total Ballots = 250”

#### Configurations

The configuration is as shown in the following block diagram.

**Figure 1: EUT Block Diagram**



#### Exercising Software

Prior to and during testing, proper operation of the EUT shall be confirmed using Dominion software. An operational status check shall be performed prior to and at the completion of testing to fully exercise the EUT and ensure that no damage has occurred as a result of the test.

#### Treatment of Test Failures

Failures of EMC tests or failures of the exercising software to perform shall be documented in the EMC test report.

#### Test Documentation

A test report shall be attained from the test lab that meets the pertinent requirements of EN45001, and ISO/IEC17025, “General Requirements of Testing and Calibration Laboratories”.

#### Test Facility Location

Criterion Technology, Inc. 1350 Tolland Road, Rollinsville, CO 80474



## 5.11 EMC TEST

### Electromagnetic Emissions

Objective: To verify that the electromagnetic emissions generated by the product under normal use and in the product's intended environment are below a level as specified by the 2005 Voluntary Voting System Guidelines (VVSG).

### Radiated Electromagnetic Emissions

**Test Method:** FCC Part 15, Radio Frequency Devices

**Deviations from Test Method:** None

**Exit Criteria:** The EUT shall meet the following emissions limits:

**Note 2:** The EUT shall be able to withstand the test without damage or loss of data. The equipment may reset or have momentary interruption so long as normal operation is resumed without human intervention or loss of data. Loss of data means votes that have been completed and confirmed to the voter.

Frequency Band (MHz)	Class B Equipment 3m Measurement Distance (dBuV/m)
30 – 88	40
88-216	43.5
216 – 960	46
960-1000	54
1000-5000	54

## 5.12 HANDLING HARDWARE ANOMALIES AND INCIDENTS

### Hardware Test Anomalies

An anomaly with the subcontractor's test equipment or a procedural misstep can cause a test to fail. For any suspected test equipment issue or procedural error, analysis will be performed and the decision whether to continue testing based on the severity of the anomaly will be appropriately tracked. The subcontractor test lab will issue a corrective action to address any test equipment and/or procedure errors. This is part of the hardware test subcontractor's quality system process that allows the hardware test lab to train all personnel, repair/calibrate equipment, and prevent any recurrence.

### Hardware Incident Process

For every test failure of any voting system component at the hardware test lab, the lab completes a data sheet (per their laboratory procedures and templates) and immediately informs the SLI Hardware Specialist. This can be communicated in the daily status update, with the data sheet attached.

- **Failure Analysis:** Once a failure has occurred, the SLI Hardware Specialist will be involved with the subcontractor test lab(s) to identify the hardware discrepancy in the device. The results of the analysis will be documented and tracked in the discrepancy reporting tool, and the ECO database under Hardware Incident. The analysis will focus on the failure, what caused the failure, the severity (minor or major), and possible impacts to other testing.
- **Mitigation:** The SLI Hardware Specialist monitors any work done by the manufacturer, with the full understanding of what is occurring and why.
  - The Manufacturer will document what work is done and the SLI Hardware Specialist will sign off on or can stop the work at any time.
  - The Hardware Specialist will determine the number of "minor" fixes the manufacturer can incorporate without a re-start of the test.
  - A **minor** change made by the manufacturer can include grounding the chassis or adding ferrites.
  - Any **major** component replacement is cause for failing a test and requiring a re-start. **Example:** Bad motherboard. **Analysis:** What was the cause; did the ESD test cause the motherboard to malfunction? Does this impact other hardware tests? The Manufacturer can only replace like for like components and this process must be monitored by the SLI Hardware Specialist.
  - Any modification to the equipment is followed up with the related manufacturer EC(s). All related ECs must be entered into the hardware test report and the certification test report

When issues are identified during hardware environmental testing, they result in discrepancies. Discrepancies are tracked in JIRA and the ECO database under the "Hardware Test Incident" category. The incident number will be tracked along with the equipment that is taken out of testing due to the failure.

**6.0 APPENDIX D: TEST EQUIPMENT AND CALIBRATION STATUS**

Manufacturer	Name/Description	Model Number	Serial Number	Cal. Due Date	Intervals
Hewlett Packard	Quasi Peak Adapter	85650A	3014A18942	5/3/2012	24 months
Hewlett Packard	Signal Generator	HP 8648D	3642000145	5/8/2012	24 months
Hewlett Packard	Spectrum Analyzer Display	HP 85662A	3014A18942	5/21/2012	24 months
Hewlett Packard	Spectrum Analyzer	HP 8566B	2240A01951	5/21/2012	24 months
Haefely Trench	ESD Gun	PESD 1600	H605100	6/2/2012	24 months
FCC	CDN	FCC-801-M3-25	9714	11/22/2012	24 months
Veratech	Preamp (AMP2)	unknown	N/A	11/26/2012	24 months
Rohde/ Schwarz	LISN	ESH2-Z5	828739-001	11/29/2012	24 months
Gigatronics	Power Sensor	80301A-410	1831996	11/30/2012	24 months
Gigatronics	Power Meter	8541C	1830945	11/30/2012	24 months
Hewlett Packard	Tracking Generator	HP85645A	3210A00124	11/30/2012	24 months
Rohde/ Schwarz	VHF/UHF Receiver	ESVS-30	863342014	11/30/2012	24 months
Rohde/ Schwarz	HF Receiver	ESHS-30	826003/011	11/30/2012	24 months
Solar Electronics	LISN	8610-50-TS-100N	13691	3/15/2013	24 months
Solar Electronics	LISN	8610-50-TS-100N	13692	3/15/2013	24 months
Solar Electronics	LISN	8610-50-TS-100N	13693	3/15/2013	24 months
Solar Electronics	LISN	8610-50-TS-100N	13690	3/26/2013	24 months
Califorina Instruments	AC Power Source Pacs-1	5001iX-CTS-411	55637/ 72242	6/11/2013	24 months
Haefely Trench	Surge Generator	PSURGE 6.1	083-906-07	11/28/2013	24 months
Haefely Trench	EFT Tester	PEFT Junior	583-333-51	11/28/2013	24 months
Haefely Trench	Surge Network	FP-Surge 32.1	083-925-05	11/28/2013	24 months
Amplifier Research	E-Field Probe	FP2000	19682	11/28/2013	24 months
Haefely Trench	Test Mag	Mag 100	80162	11/29/2013	24 months
Amplifier Research	E-Field Probe	FP2080	20236	11/30/2013	24 months

## 7.0 APPENDIX E: TEST DIRECTIVES, STANDARDS AND METHODS

### 8.1 EUROPEAN DIRECTIVES, STANDARDS AND METHODS

89/336/EEC: Council Directive of 03 May 1989 on the Approximation of the Laws of the Member States Relating to Electromagnetic Compatibility, OJEC No. L 139/19-26, Aug 1993.

EN 55011:2009+A1:2010(CENELEC): ISM Radio-Frequency Equipment Radio Disturbance Characteristics - Limits and Methods of Measurement.

EN 55022:2006+A1:2007 (CENELEC): ITE - Radio-Frequency Equipment Radio Disturbance Characteristics - Limits and Methods of Measurement.

EN 55024:2010 (CENELEC): ITE - Immunity Characteristics - Limits and Methods of Measurement.

EN 55103-2: Product Family standard for audio, video, audio - visual and entertainment lighting control apparatus for professional use. Part 2: Immunity, April 1997.

EN 60601-1-2:Third Edition 2007-03 (CENELEC): Medical Electrical Equipment. Part 1. General Requirements for Safety - Section 1.2. Collateral Standard: Electromagnetic Compatibility - Requirements and Tests.

EN 61000-6-2:2005 EMC- Part 6-2. Generic Standard-Immunity for Industrial Environments, 2005.

EN 61000-6-3:2007 EMC- Part 6-3. Generic Standard-Emissions for residential, commercial and light-industrial Environments 2007.

EN61000-6-4:2007 (CENELEC): EMC - Generic Emission Standard, Part 6-4: Industrial Environment, 2007.

EN 61000-3-2:2006+A2:2009 (CENELEC): EMC - Part 2. Limits for Harmonic Current Emissions (Equipment Input Current  $\leq 16$  A per phase).

EN 61000-3-3:2008 (CENELEC): EMC - Part 3. Limitation of Voltage Fluctuation and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current  $\leq 16$  A.

EN 61000-4-7: 2002, incorporating corrigenda Nos. 1:2004 and 2:2005. (CENELEC): EMC – Part 4-7 Testing and measurement techniques – General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto: .

EN 61000-4-2:2009 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 2. Electrostatic Discharge Immunity Test, 2009.

EN 61000-4-3:2006+A2:2010 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 3. Radiated, Radio-Frequency, Electromagnetic Field Immunity.

EN 61000-4-4:2004+A1:2010 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 4. Electrical Fast Transient/Burst Immunity Test.

EN 61000-4-5:2006 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 5. Surge Immunity Test.

EN 61000-4-6:2009 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 6. Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields.

EN 61000-4-8:2010 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 8. Power Frequency Magnetic Field Immunity Test.

EN 61000-4-11:2004 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 11. Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests.

EN 61326:2005 (CENELEC): Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements.

EN 61326-1:2006 Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements, - Part 1: General Requirements.

8.2 47 CFR FCC PART 15 RADIO FREQUENCY DEVICES: OCT 2011

Subpart A General.

Subpart B Unintentional Radiators.

Subpart C Intentional Radiators.

Subpart D Unlicensed Personal Communications Service Devices.

8.3 47 CFR FCC PART 22 PUBLIC MOBILE SERVICES: OCT 2011

8.4 47 CFR FCC PART 24 PERSONAL COMMUNICATIONS SERVICES: OCT 2011

8.5 JAPAN

VCCI V-3

8.6 CANADA

ICES-001: Interference-Causing Equipment Standard - ISM RF Generators, 2006.

ICES-003: Interference-Causing Equipment Standard - Digital Apparatus, 2004.

8.7 AUSTRALIA/NEW ZEALAND

SAA AS/NZ 3548: Limits and Methods of Measurement of Radio Disturbance Characteristics of ITE, 1997.

AS/NZS 4268:2003: Radio Equipment and systems-Short range devices-Limits and methods of measurement. 2003

AS/NZS CISPR22

8.8 TAIWAN

CNS13438, 2006.

8.9 KOREA

KN22, September 29, 2005

KN 24, 1998

8.10 VOLUNTARY VOTING SYSTEM GUIDELINES

VVSG -Volume 1 Version 1.0, 2005

VVSG-Volume 11 Version 1.0, 2005