Wisconsin Elections Commission

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DATE: For the November 02, 2023, Commission Meeting

TO: Members, Wisconsin Elections Commission

FROM: Meagan Wolfe, Administrator

SUBJECT: **Dominion Voting Systems**
Petition for Approval of Electronic Voting Systems
Democracy Suite 5.17 and Democracy Suite 5.17S

Introduction

Dominion Voting Systems (DVS) is requesting approval from the Wisconsin Elections Commission (WEC or Commission) for the Democracy Suite 5.17 and 5.17S voting systems. This approval will allow for the sale and use of these systems in the State of Wisconsin. No electronic voting equipment may be offered for sale or utilized in Wisconsin unless first approved by the WEC based upon the certification requirements laid out in Wis Stat. § 5.91 (Appendix A). The WEC has also adopted administrative rules further clarifying the testing and approval processes in Wisconsin Administrative Code, Chapter EL 7 (Appendix B).

Electronic Voting Systems in this Application

Democracy Suite 5.17

Democracy Suite 5.17 is a federally tested and certified paper based, optical scan voting system. It includes the following major components:

Component	Function
Election Management System (EMS)	Election management software application that provides election definition creation, ballot formatting, equipment configuration, result consolidation, adjudication, and report creation
ImageCast Central (ICC)	A high-speed, central ballot scan tabulator for use in central count locations
ImageCast Precinct 2 (ICP2)	A precinct-based optical scan ballot counter
ImageCast Evolution (ICE)*	A precinct-based optical scan ballot counter
ImageCast X (ICX) Ballot Marking Device*	This configuration is a touchscreen ballot marking device (BMD) that is paired with a printer. A voter will indicate their selections on the BMD, a ballot will be printed with those choices, and the voter will then deposit the ballot into a tabulator after a final review

ImageCast X (ICX) BMD and Tabulator*	The second ICX configuration features the same BMD functionality, but also includes the ability to tabulate on the same unit via a voter-verified paper audit trail (VVPAT)
*These devices are compliant with the requirements set forth in the Americans with Disabilities Act (ADA) for accessible voting systems. Further detail on each device and its respective features will appear later in this report.	

Democracy Suite 5.17S

Democracy Suite 5.17S is a federally tested modification to the Democracy Suite 5.17 voting system. The modification provides support for modeming of unofficial election results after the polls close on Election Day from either an ImageCast Evolution tabulator or ImageCast Precinct tabulator to a Secure File Transfer Protocol (SFTP) server through wireless telecommunications networks or analog phone lines. The modeming components of Democracy Suite 5.17S cannot meet federal certification standards, but the underlying voting system (Democracy Suite 5.17) is federally certified. While this system has not received federal certification, it was presented for and passed thorough telecommunications testing at an EAC accredited Voting System Test Laboratory (VSTL).

At its May 21, 2013, meeting, pursuant to authority granted in Wis. Stat. § 5.91 and Wisconsin Administrative Code, Chapter EL 7, the Government Accountability Board adopted testing procedures and standards pertaining to the modeming and communication functionality of voting systems that have not yet received EAC certification. At its September 9, 2021, meeting, the Wisconsin Elections Commission approved an updated version of these testing criteria and protocols. The procedures used by WEC staff to test the modeming capabilities of this system can be found in Appendix E of this report.

Recommendation

WEC staff is recommending approval of both Democracy Suite 5.17 and Democracy Suite 5.17S for sale and use in Wisconsin. Detailed recommendations are listed on pages 16-18 following further analysis of the functional testing performed by staff to analyze the voting systems under consideration.

Application Background

On June 30, 2023, WEC staff received an Application for Approval of Electronic Voting System for both Democracy Suite 5.17 and Democracy Suite 5.17S. DVS submitted complete specifications for hardware, firmware, and software related to the voting system. Also included with the submission were technical manuals, documentation, and user manuals necessary for the operation of the components in the two electronic voting systems.

Democracy Suite 5.17 System Overview

The Voting System Test Laboratory (VSTL) responsible for testing Democracy Suite 5.17, Pro V&V, is based in Huntsville, Alabama and is one of two test labs currently accredited by the EAC to conduct voting system testing. Pro V&V conducted rigorous testing of this system and issued both their final test report and

recommendation for EAC certification on March 15, 2023. Democracy Suite 5.17's EAC Certification Number is DVS-DemSuite5.17.

Following VSTL testing, the EAC issued a Certificate of Conformance and an accompanying Scope of Certification document for this voting system on March 16, 2023. These documents signify that the system has been tested in accordance with current federal certification standards for electronic voting systems and that the system has met or exceeded those standards.

WEC staff conducted state-level certification testing for Democracy Suite 5.17 in the WEC office September 26-29, 2023. This period included functional testing, which requires all components of the system to correctly process three mock elections, a meeting of the Wisconsin Voting Equipment Review Panel, which is a body of local election officials and third-party advocates, and a public demonstration of the system.

Hardware and Software Components

This section provides additional information on the hardware and software components of this voting system that are most likely to be used in either a polling place or a central count location. A full list of hardware and software components may be found in Appendix C.

ImageCast Evolution

The ImageCast Evolution (ICE) is a digital scan paper ballot tabulator designed for use at the polling place. After the voter marks a paper ballot, either by hand or by using the ImageCast X ballot marking device, the ballot is inserted into the ICE for processing. The tabulator uses a high-resolution scanner to simultaneously image the front and back of the ballot. The resulting ballot images are then processed by proprietary mark recognition software, which identifies and evaluates marks made by the voter. The system then tabulates any votes cast on each ballot before depositing the ballot into an integrated secure storage bin.

When a ballot is inserted into an ICE unit, the unit will interpret voter marks on the ballot and a variety of feedback screens will be displayed to the voter. These range from a confirmation that the ballot was accepted to a warning that any ballots containing crossover votes or overvoted contests may lead to the voter's choices not being counted. In these instances, the voter will have the opportunity to have the ballot returned to them for further review or may choose to cast the ballot as they originally marked it. A sample of these voter information screens has been included with this report and can be found in Appendix D.

Ballot images and election results generated by the ICE are stored on two separate removable compact flash memory devices. These compact flash drives operate in unison to maintain a detailed audit log of the tabulation events on election day. The cards maintain all ballot images and ballot manifests, a record of the disposition of each ballot, i.e., how the ICE interpreted and counted each vote on a given ballot. The compact flash memory cards may be taken to the municipal clerk's office or county clerk's office where the election results may be uploaded into an election results management program or transferred to another memory device to facilitate storage. The ICE includes an internal thermal printer for the printing of the zero reports, log reports, and polling place totals upon the official closing of the polls. As part of Democracy Suite 5.17S, ICE tabulators also include

external wireless and analog modems for the transmission of unofficial election results via a secure wireless network hosted by Verizon Wireless or a standard telephone line.

The ICE also serves as an ADA-compliant ballot marking device, designed for accessible use by voters who have visual, auditory, or physical limitations or disabilities. Depending upon the configuration, voting either occurs on the primary tabulator screen or on an external monitor, both of which require using an assistive input device to make ballot selections. If the primary tabulator monitor is used for accessible voting, other ballot processing must be temporarily suspended until the accessible session has ended. When utilizing the external monitor, ballot processing on the tabulator can continue during the accessible voting session.

An election inspector is required to begin the accessible voting session. Instructions that guide the voter through the process appear on the screen or can be accessed via the audio ballot function. Voters use an integrated tactile keypad, sip and puff device, or paddle selectors to navigate the ballot and make contest selections. Each button on the tactile keypad has both Braille and printed text labels designed to indicate function and a related shape to help the voter determine its use. In addition, voters may use headphones to access the audio ballot function that provides a recording of the ballot instructions and lists candidates and options for each contest.

A blank ballot is inserted into the tabulator ballot slot prior to making selections when the primary screen is used. For locations with an external monitor, voters make ballot selections and place the blank ballot in the tabulator ballot slot at the end of the accessible voting session. In either method, the ballot is marked according to the voter's selections and automatically returned for review. Once the voter has reviewed their ballot, it is reinserted into the tabulator for processing.

ImageCast Precinct 2

The ImageCast Precinct 2 (ICP2) is a digital scan paper ballot tabulator designed for use in a polling place. After the voter marks a paper ballot, either by hand or by using the ImageCast X ballot marking device, the ballot is inserted into the ICP2 for processing. The tabulator uses a high-resolution scanner to simultaneously image the front and back of the ballot. The resulting ballot images are then processed by proprietary mark recognition software, which identifies and evaluates marks made by the voter. The system then interprets any votes cast on each ballot before depositing the ballot into an integrated secured storage bin. As with the ICE, the ICP2 will display a variety of informational screens to the voter when a ballot is inserted.

The ballot images and election results are stored on two separate removable secure digital (SD) memory devices. These SD drives operate in unison to maintain a detailed audit log of the tabulation events on election day. Following the election, the cards may be taken to the municipal or county clerk's office to be uploaded into an election results management program or transferred to another media device to facilitate secure storage. The ICP2 includes many of the same functionalities as the ICE, including generation of ballot images and ballot manifests, a thermal printer for generation of zero tapes, log reports, and results tapes, and, for ICP2 units as part of Democracy Suite 5.17S, the ability to transmit unofficial election results securely via either a wireless or analog modem. On its own, The ICP2 does not include any accessible voting functionality and would need to be paired with another ADA-compliant component from the system to meet accessible voting requirements for use in a polling place.

Both the ICE and ICP2 may be programmed to automatically reject all ballots with overvotes or crossover votes without the option for override, which requires the voter to correct any error by spoiling their first ballot and marking a new one. This ensures that voters do not mistakenly process a ballot on which a vote for one candidate or all candidates will not count. In jurisdictions that enable this function, absentee ballots must be remade by election inspectors to preserve voter intent as closely as possible. For example, in the case of a ballot with a single overvoted contest, the entire ballot would be remade to preserve all the voter's marks apart from the marks in the overvoted contest.

The ICE and ICP2 are also capable of producing a results report showing all candidates with write-in votes. This report captures an image of what is written on the write-in vote line, but only if the oval next to the write-in field under a contest was filled by the voter. As it currently stands, election inspectors cannot rely on this report as a means of counting write-in votes after the polls close. Instead, inspectors must review all ballots cast in a jurisdiction by hand to ensure voter intent is being captured. This particularly applies to instances in which a voter writes in a candidate for a specific contest but does not fill in the oval for the write-in field.

ImageCast Central

The ImageCast Central (ICC) is a high-speed, digital scan ballot tabulator designed for use by election officials at a central count site. The ICC is capable of scanning ballots of various sizes and utilizes a commercial off the shelf (COTS) printer to process the front and back of each ballot, evaluate the result, and maintain continuous scanning and tabulating. The scanner is paired with a workstation on which an election worker can monitor the scan speed and track the progress of each batch of ballots being processed.

ImageCast X

The ImageCast X (ICX) is an ADA-compliant accessible touchscreen device that is available in two separate hardware configurations. The first configuration, which is paired with a standalone printer, is a ballot marking device. This configuration does not have any tabulation functionality, but the ballots that are generated and printed by the device are virtually indistinguishable from hand-marked ballots and may be inserted into the ICE, ICP2, or ICC for tabulation. The second configuration, which includes a printer attached to the unit itself, is a direct recording electronic (DRE) device that tabulates votes and records each ballot on a voter verifiable paper audit trail. Both configurations utilize COTS components, e.g., touchscreen displays and desktop printers, which are paired with DVS software to form a voting device.

For each configuration, an activation card is necessary to begin a voting session. Additionally, poll worker activation cards are used by election officials to perform maintenance to the device or access the administrative menu to open or close polls. Activation cards used by voters may be configured for each ballot style in use at a polling place to ensure a voter is voting the correct ballot. These cards can be configured to require reprogramming after each use and a time limit may be set for each card. If a voter card is not used prior to the set time limit, it will no longer function with the equipment and will require reactivation before it may be used again.

Once the correct ballot style has been selected, either by an election inspector or by the voter using a pre-programmed voter activation card, the voter is left to navigate the ballot and cast their votes privately. Voters have the option to use the touchscreen, a sip and puff device, paddle selectors, or a tactile keypad to navigate the ballot and make their selections. Instructions that guide the voter through the process appear on the screen or can be accessed via the audio ballot function. Voters have the option to adjust the text display contrast and text size to suit their preferences. Each button on the tactile keypad has both Braille and printed text labels designed to indicate function and a related shape to help the voter determine its use. Voters may also use headphones to access the audio ballot function that provides a recording of the ballot instructions and lists candidates and options for each contest. The volume of the audio can be adjusted by voters.

In both the BMD and VVPAT configurations, the ICX provides a ballot summary screen on which voters review their selections before the ballot is printed. On the VVPAT configuration, the voter will have a final chance to review their choices on the tape before the ballot is cast. The VVPAT printer features an opaque window that illuminates the voter's choices on the paper roll in this final step. If the voter wishes to spoil their ballot and mark a new one, this is the final opportunity to do so. When the voter casts their ballot, the roll advances, the viewing window darkens, and the ICX is ready for the next voting session. On the BMD configuration, the voter will have a final chance to review their choices on the marked ballot produced by the printer prior to inserting the ballot into one of the supported tabulators in this system.

Neither configuration allows a voter to overvote any contest or, when applicable, vote a crossover ballot in which they vote in multiple party primaries. For elections that feature a party preference, e.g., partisan primaries, the voter is presented with the party options at the start of the voting session. When a voter chooses a party, the ICX will only display the candidates within that respective party's primary. The ballot summary screen that appears before the voter casts their ballot will also advise of any contest in which the voter has undervoted, at which point they will be able to return to the contest in question and mark their selection should they choose to do so.

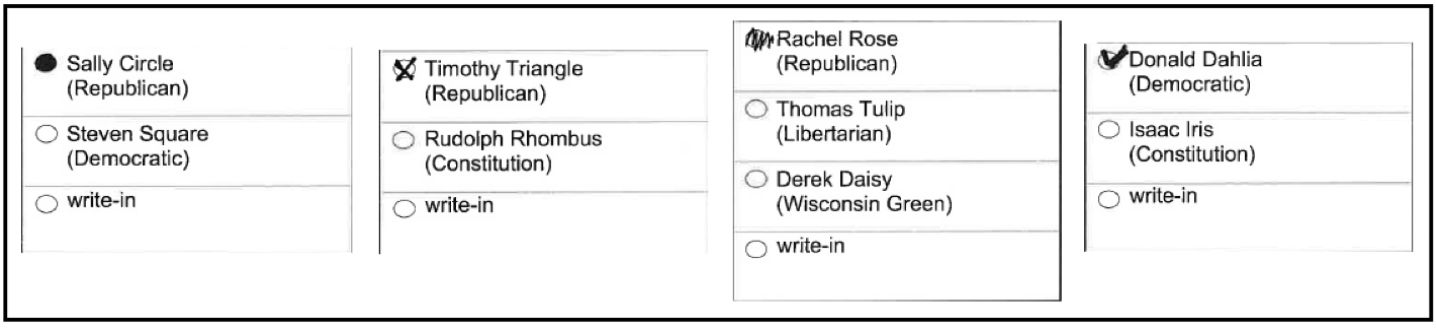
Functional Testing

As required by Wisconsin Administrative Code, Chapter EL 7, WEC staff conducted three mock elections with each component of Democracy Suite 5.17 and 5.17S to ensure the voting systems conform to all Wisconsin-specific requirements. As in every certification, these mock elections included a partisan primary with a special nonpartisan school board election, a general election with both a presidential and special gubernatorial contest, and a presidential preference vote combined with nonpartisan offices and a special partisan contest.

Staff prepared a series of test decks using various configurations of votes, e.g., valid votes, overvotes, crossover votes, etc., across all three mock elections to verify the accuracy and functional capabilities of the two systems. Using blank ballot stock provided by DVS, WEC staff hand marked 300 ballots for each of the mock elections. For each election, an additional 50 ballots were marked using the ICE's accessible voting feature and another 50 were marked using the ICX BMD, bringing the total for each test deck to 400 ballots. Additionally, three separate test decks of 200 ballots each rtwere marked on the ICX VVPAT and reconciled separately.

To ensure that the equipment in this voting system was compatible with Wisconsin election law and able to process a variety of marks, the test ballots for each mock election included several ballots purposefully marked in ways not typically recommended by the vendor. In all cases where ballots were intentionally marked with overvotes, all tabulation equipment in this system was able to consistently identify those issues and displayed the requisite warning. The same was true for crossover votes, which require a voter to vote in multiple primaries/cross party lines and are only possible in the mock partisan primary and presidential preference elections. Additionally, each mock election has two separate ballot styles, one of which includes a special contest or referendum question and one that does not. Including two separate styles assesses the ability to program multiple election definitions on each piece of equipment and to produce accurate results. In all instances, the equipment accurately tabulated votes between the separate ballot styles.

Test decks were also marked to determine exactly what constitutes a readable mark by each piece of tabulation equipment in this voting system. A subset of ballots for each mock election included "special marks," shown here:



The first column shows a "typical" mark, i.e., a completed oval and the most common way a voter will mark a ballot. The following columns show a selection of marginal or ambiguous marks, which include less-common ways a voter may complete an oval to indicate their choices. Each piece of tabulation equipment in this voting system was able to identify the ambiguous marks as valid choices in all three mock elections.

Every voting equipment vendor recommends a specific type of marking device that should be used to complete a ballot. DVS recommends either a black Paper Mate Flair felt tip pen or a black Sharpie pen. Staff used both recommended marking devices to mark most ballots in each test deck, but also included a variety of other marking devices to ensure the system was capable of tabulating votes marked with green ink, red ink, blue ink, and pencil. As in past certification testing, certain components of these systems had issues properly reading ballots marked in red ink. This issue is described in greater detail in the testing anomalies section of this report.

Staff also included several ballots with folds and tears. In some cases, a torn ballot may jam the tabulator or not be read correctly by tabulation equipment. However, this happens much more commonly in instances where the tear goes through the timing marks that surround the outside of the ballot. If a ballot is torn severely enough that the tabulator cannot process it, it will be returned to either the voter or election inspector for review and will not be tabulated. Folded ballots are included to replicate (as closely as possible) an absentee ballot that will be processed either at the polling place or a central count location. Vendors recommend that all absentee ballots be scored in specific places on the ballot to avoid the potential of a particularly heavy crease reading as a "false positive" vote if the crease goes directly through an oval. Staff folded several test ballots to purposefully place the creases through ovals and no such false positive votes or overvotes were read by the tabulation equipment. If election inspectors encounter ballots that are torn or contain heavy creases outside of the scoring marks, it is

advisable to follow the procedures for remaking the ballots in question to ensure the voter's choices are being accurately counted.

Testing Anomalies

Staff encountered two issues in the process of testing these voting systems. The first was an inconsistency in how ballots purposefully marked with red ink were read by each tabulator. While the ICC and ICE were able to read ovals marked with a red pen, the ICP2 did not read those ovals and treated any ballot marked with red ink as a blank ballot. This issue was also seen in prior certification testing for other voting systems and the steps to avoid votes not being counted have been included as a recommendation for certification in those systems as well. Staff recommends that any only the marking devices recommended by DVS be made available for in-person voting and that any absentee ballot that is marked in red ink be remade by election inspectors using a recommended black marking device prior to tabulation. Remaking such ballots will ensure that voter intent is preserved, and a voter's choices will be reflected during tabulation.

The second issue was found while reconciling the results for the three separate mock elections tested on the ICX VVPAT configuration. Each of these mock elections has a separate testing script of 200 ballots that must be marked correctly and in order. As the device in question utilizes a VVPAT printer, the records of votes cast on each ballot are all contained on a single roll of paper. Unfortunately, in each election, at least one ballot was marked incorrectly, which necessitated a second review of every ballot on the roll to identify the discrepancy. In every instance, the mismarked ballots were identified by staff during this review. For the sake of an example, this issue occurred most frequently in the General Election in which four ballots that were scripted to be marked with a write-in vote for U.S. Senator were marked with a write-in vote for State Senator instead. After identifying each mismarked ballot and ascertaining which contests were marked incorrectly, the election results reconciled correctly. To be completely clear, the discrepancies caused by these mismarked ballots were a result of human error and are not indicative of the hardware's capability to accurately tabulate votes.

Democracy Suite 5.17S System Overview

For certification purposes, Democracy Suite 5.17S is a separate system from the base Democracy Suite 5.17 system. This system includes the hardware and software components featured in the base Democracy Suite 5.17 system with the added capability to transmit unofficial results from a polling place or central count location via a secure modem. These unofficial results are transmitted from either an ICE or ICP2 to a Secure File Transfer Protocol (SFTP) using the ImageCast Listener server software located in the office of the county clerk. Transmissions are sent through a secured and encrypted wireless communications network or analog phone network. All modifications of the base system present in Democracy Suite 5.17S were tested by Pro V&V to the 2005 Voluntary Voting System Guidelines (VVSG) protocols.

Modeming functions on the ICE and ICP2 may only be used after an election inspector has closed the polls, utilized a multi-factor authentication token, and entered a password to access the poll worker menu. Following the printing of the results tape, election inspectors connect the external modem and select the option to transmit results to the county on the poll worker menu of the tabulator. After this option is selected, the tabulator screen provides informational prompts to the election inspectors related to where in the transmission process the machine is at any given time. The encrypted data packet comprised of the unofficial election results is received in the county office by the ImageCast Listener server and EMS server software.

In the county clerk's office, a firewall provides a buffer between the network segment, where the election server is located, and other internal networks which utilize separate servers. The data that is transmitted is encrypted and it is digitally signed. The network is configured to only allow valid connections with the correct encryption key to connect to the SFTP server. The firewall further restricts the flow and connectivity of traffic. Only after the system determines that an incoming data packet has been correctly signed and encrypted by a state with an approved key, the information is passed through the SFTP server and on to the Election Management System (EMS) workstation. The EMS contains matching decryption keys for each encryption key approved for the election. If it does not have a decryption key that matches that of the incoming transmission, or if some aspect of the hardware sending the transmission cannot be authenticated by the server and EMS workstation software, the transmission is rejected.

The EMS is required to be deployed on a hardened and air gapped system pursuant to the 2005 Voluntary Voting System Guidelines, meaning that all software that is not essential to the proper functioning of the EMS is removed from the computer where the EMS is installed. This procedure is designed to increase the security of the system through the elimination of applications that may provide "back door" access to the system. Access to the internet is also restricted and the EMS provides an audit log of all system actions and connection attempts that can be used to verify unauthorized access to the system while unofficial election results are being transmitted after the close of polls.

At its May 21, 2013, meeting, pursuant to authority granted in Wis. Stat. § 5.91 and Wisconsin Administrative Code, Chapter 7, the Government Accountability Board (GAB) adopted testing procedures and standards pertaining to the modeming and communication functionality of voting systems that have not received EAC certification. The standards were based upon the analysis and findings outlined in a staff memorandum and detailed in the *Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin*. At its September 9, 2021, meeting, the Wisconsin Elections Commission approved an updated version of these testing criteria and protocols, which are attached as Appendix E. These rules apply to non-EAC certified voting systems, where the underlying voting system received EAC certification to either the 2002 Voting System Standards (VSS) or 2005 VVSG, but any additional modeming component does not meet the 2005 VVSG.

Modem/Telecommunication Testing

WEC staff conducted testing of Democracy Suite 5.17S in three counties: Washington, Green, and Walworth, between October 10 and 12, 2023. As a result of technical issues in the original modem tests, a follow up round of testing was conducted in Green County on October 13, 2023. DVS representatives worked with counties that currently use the vendor's equipment to identify three municipal test sites in each of the three counties.

A four-person team of WEC staff conducted this testing with technical support from a team of four DVS representatives. DVS provided three ICE tabulators and three ICP2 tabulators that were each tested in all test locations. DVS also provided a portable secure EMS environment, which was configured to emulate how an EMS would be implemented in a county office, including an SFTP client, firewall, etc. This portable environment was set up in each county office to receive test transmissions from the three respective municipal test sites in each county.

At each municipal site, WEC staff inserted a pre-marked test deck into both the ICE and ICP2 tabulator, closed the polls, and proceeded to test the results transmission function for each tabulator. One WEC staff member remained in the county office to monitor the incoming transmissions and coordinate the testing efforts. As in prior certification campaigns, staff tested both wireless and analog modems to ensure the results packets created

by the ICE and ICP2 tabulators were able to transmit to the county office reliably. The results of this testing appear in the following tables.

Washington County (Wireless Pantech Modem)

	ICE	ICP2
Town of Trenton		
Initial Transmission	10 of 10	10 of 10
Load Test	14 of 14	8 of 8
Village of Germantown		
Initial Transmission	10 of 10	10 of 10
Load Test	13 of 13	8 of 8
Village of Kewaskum		
Initial Transmission	10 of 10	10 of 10
Load Test	14 of 14	14 of 14
Load Test Results	41 of 41	30 of 30

Walworth County (Wireless Pantech Modem)

	ICE	ICP2
Town of Troy		
Initial Transmission	10 of 10	10 of 10
Load Test	9 of 9	8 of 8
Village of Genoa City		
Initial Transmission	10 of 10	10 of 10
Load Test	14 of 14	13 of 13
Village of Lake Geneva		
Initial Transmission	10 of 10	10 of 10
Load Test	11 of 11	12 of 12
Load Test Results	34 of 34	33 of 33

Green County (Analog MultiTech Modem)

	ICE	ICP2
Town of Adams		
Initial Transmission	10 of 10	10 of 10
Load Test	5 of 5	7 of 7
Town of Exeter		
Initial Transmission	10 of 10	10 of 10
Load Test	5 of 5	5 of 5
Town of New Glarus		
Initial Transmission	10 of 10	10 of 10
Load Test	4 of 4	5 of 5

Load Test Results	14 of 14	17 of 17

In each of the three counties, testing was ultimately successful. The WEC staff member working in each municipality is instructed to first send 10 results packet transmissions through to the county from each tabulator. This stage of testing is coordinated to ensure only a single municipality is transmitting at any one time. After each municipality completes this step, the WEC staff members then all attempt to transmit results simultaneously for a set period of time to emulate the conditions of a real election in which the county office would be receiving unofficial results from every municipality in the county. This stage of testing is referred to as load testing.

As expected, the number of transmissions that can be sent and received simultaneously during the load test is much higher in counties that use wireless modems, as these modems allow for multiple incoming encrypted transmissions at a time. In the case of Green County, which uses analog modems, the ability to send and receive results packets is limited by the fact that the county has a single analog phone line through which these transmissions must flow. Accordingly, transmissions sent from Green County municipalities sometimes required multiple attempts, as the phone line at the county was busy receiving data from another location.

As previously mentioned, WEC staff and DVS representatives conducted a second day of testing in Green County. There were a few contributing factors that led to a second round of tests. The first issue was due to specific phone jacks at the county and municipal offices no longer being functional after a recent building renovation. County staff was later able to find a phone jack with a signal, which solved this problem. As counties and municipalities continue to transition away from analog phone networks to digital options, it may become harder to keep the infrastructure necessary for analog results transmission in place. The second and much larger issue was that the passwords programmed on the secure media cards for each of the tabulators being tested were entered incorrectly during the programming process. As the EMS as the county did not recognize the passwords being used by the tabulators, all the attempts to transmit results were rejected accordingly. While slightly frustrating from a logistical standpoint, this does serve as proof of concept that the results transmission process is secure.

Each of the two tabulators capable of transmitting unofficial results is also capable of using two separate modems to complete that task. For counties that use analog modems, the two external modem options are a StarTech modem or a MultiTech Modem. For counties that use wireless modems, the external modem options are either a Pantech modem or a MultiTech modem. In each case, only one of the two modem options was tested and staff recommendations for certification will only include the Pantech modem for wireless jurisdictions and the MultiTech modem for analog jurisdictions. These are the only two modem types currently used by DVS customers in Wisconsin and any future effort to introduce other types of modems would necessitate a full certification campaign.

Wisconsin Elections Commission Voting Equipment Review Panel

To solicit valuable feedback from local election officials and community advocates, the WEC formed the Voting Equipment Review Panel. In accordance with Wisconsin Administrative Code, Chapter EL 7, this panel includes municipal and county clerks, representatives of the disability community, and other advocates for the interest of the voting public.

Members of this panel attended the meeting both in person and virtually via Zoom. The meeting took place at the WEC office in Madison on September 28, 2023, from 2:00 p.m. to 3:30 p.m. DVS representatives provided a demonstration of both voting systems and attendees were encouraged to test the equipment themselves by

marking ballots and interacting with all the hardware components under consideration. Comments and feedback from the Voting Equipment Review Panel are included as Appendix F.

Public Demonstration

Following the Voting Equipment Review Panel, a public demonstration was held on September 28, 2023, from 4:00 p.m. to 5:00 p.m. The public demonstration was appropriately noticed as a public meeting and was held in person in the WEC offices with DVS representatives available to answer questions and guide attendees through the functionality of the equipment. There were no attendees.

Statutory Compliance

Wis. Stat. § 5.91 provides the following requirements voting systems must meet to be approved for use in Wisconsin. Please see the text below of each requirement and staff's analysis of each system's compliance with the standards.

Wis. Stat. § 5.91(1)
The voting system enables an elector to vote in secret.
Staff Analysis
The DVS voting systems meet this requirement by allowing a voter to vote a paper ballot in the privacy of a voting booth or at the accessible voting station without assistance.

Wis. Stat. § 5.91(3)
The voting system enables the elector, for all elections, except primary elections, to vote for a ticket selected in part from the nominees of one party, and in part from nominees from other parties and write-in candidates
Staff Analysis
The DVS voting systems allow voter to split their ballot among as many parties as they wish during any election that is not a partisan primary.

Wis. Stat. § 5.91(4)
The voting system enables an elector to vote for a ticket of his or her own selection for any person for any office for whom he or she may desire to vote whenever write-in votes are permitted.
Staff Analysis
The DVS voting systems allow write-ins where permitted.

Wis. Stat. § 5.91(5)
The voting systems accommodate all referenda to be submitted to electors in the form provided by law.
Staff Analysis
The DVS voting systems meet this requirement. Referenda included as part of testing were accurately tabulated by all components.

Wis. Stat. § 5.91(6)
The voting system permits an elector in a primary election to vote for the candidates of the recognized political party of his or her choice, and the system rejects any ballot on which votes are cast in the primary of more than one recognized political party, except where a party designation is made or where an elector casts write-in votes for candidates of more than one party on a ballot that is distributed to the elector.
Staff Analysis
The DVS voting systems can be configured to always reject crossover votes without providing an opportunity for the voter to override. The system can also be programmed to provide a warning screen to the voter that identifies any crossover voted contest. Either one of these programming options allows these systems to meet this requirement. The warning screen provides options where the voter can choose to have their ballot returned to them or they can cast the ballot without correcting the crossover vote. The use of the override function was previously prohibited by statute, but Wis. Stats. §5.85(2)(b) expressly allows for the optional use of the override function in event of an overvote and the WEC has applied the same standard to the use of the override function in the event of crossover vote.

Wis. Stat. § 5.91(7)
The voting system enables the elector to vote at an election for all persons and offices for whom and for which the elector is lawfully entitled to vote; to vote for as many persons for an office as the elector is entitled to vote for; to vote for or against any question upon which the elector is entitled to vote; and it rejects all choices recorded on a ballot for an office or a measure if the number of choices exceeds the number which an elector is entitled to vote for on such office or on such measure, except where an elector casts excess write-in votes upon a ballot that is distributed to the elector.
Staff Analysis
The DVS voting systems can be configured to always reject overvotes without providing an opportunity for the voter to override. The system can also be programmed to provide a warning screen to the voter that identifies any overvoted contest. Either one of these programming options allows these systems to meet this requirement. The warning screen provides options where the voter can choose to have their ballot returned to them or they can cast the ballot without correcting the overvote. The use of the override function was previously prohibited by statute, but Wis. Stats. §5.85(2)(b) expressly allows for the optional use of the override function in event of an overvote.

Wis. Stat. § 5.91(8)
The voting system permits an elector at a General Election by one action to vote for the candidates of a party for President and Vice President or for Governor and Lieutenant Governor.
Staff Analysis
The DVS voting systems meet this requirement.

Wis. Stat. § 5.91(9)

The voting system prevents an elector from voting for the same person more than once, except for excess write-in votes upon a ballot that is distributed to the elector.
Staff Analysis
The DVS voting systems meet this requirement.

Wis. Stat. § 5.91(10)
The voting system is suitably designed for the purpose used, of durable construction, and is usable safely, securely, efficiently, and accurately in the conduct of elections and counting of ballots.
Staff Analysis
The DVS voting systems meet this requirement.

Wis. Stat. § 5.91(11)
The voting system records and counts accurately every vote and maintains a cumulative tally of the total votes cast that is retrievable in the event of a power outage, evacuation or malfunction so that the records of votes cast prior to the time that the problem occurs is preserved.
Staff Analysis
The DVS voting systems meet this requirement.

Wis. Stat. § 5.91(12)
The voting system minimizes the possibility of disenfranchisement of electors as the result of failure to understand the method of operation or utilization or malfunction of the ballot, voting system, or other related equipment or materials.
Staff Analysis
The DVS voting systems can be programmed to provide warning screens to the voter that identifies any problem with their ballot. The warning screens provide an explanation of the problem and allow the voter to have their ballot returned to them to review and correct the error. The systems can be configured to always reject overvotes and crossover votes without providing an opportunity for the voter to override.

Wis. Stat. § 5.91(13)
The automatic tabulating equipment authorized for use in connection with the system includes a mechanism which makes the operator aware of whether the equipment is malfunctioning in such a way that an inaccurate tabulation of the votes could be obtained.
Staff Analysis
The DVS voting systems meet this requirement.

Wis. Stat. § 5.91(14)
The voting system does not use any mechanism by which a ballot is punched or punctured to record the votes cast by an elector.
Staff Analysis
The DVS voting systems do not use any such mechanism to record votes.

Wis. Stat. § 5.91(15)
The voting system permits an elector to privately verify the votes selected by the elector before casting his or her ballot.
Staff Analysis
The DVS voting systems meet this requirement through the use of hand-marked paper ballots and accessible voting equipment that provides both an electronic ballot review screen or a marked paper ballot that can be reviewed before tabulation.

Wis. Stat. § 5.91(16)
The voting system provides an elector the opportunity to change his or her votes and to correct any error or to obtain a replacement for a spoiled ballot prior to casting his or her ballot.
Staff Analysis
The DVS voting systems meet this requirement.

Wis. Stat. § 5.91(17)
Unless the ballot is counted at a central counting location, the voting system includes a mechanism for notifying an elector who attempts to cast an excess number of votes for a single office the ballot will not be counted and provides the elector with an opportunity to correct his or her ballot or to receive a replacement ballot.
Staff Analysis
The DVS voting systems can be programmed to provide warning screens to the voter that identifies any problem with their ballot. The warning screens provide an explanation of the problem and allow the voter to have their ballot returned to them to review and correct the error. The systems can be configured to always reject overvotes and crossover votes without providing an opportunity for the voter to override.

Wis. Stat. § 5.91(18)
If the voting system consists of an electronic voting machine, the voting system generates a complete, permanent paper record showing all votes cast by the elector, that is verifiable by the elector, by either visual or nonvisual means as appropriate, before the elector leaves the voting area, and that enables a manual count or recount of each vote cast by the elector.
Staff Analysis
The DVS voting systems meet this requirement by utilizing either traditional paper ballot stock or a voter-verified paper audit trail that serves as a record of all votes cast.

The Help America Vote Act of 2002 (HAVA) also provides the following applicable requirements that voting systems must meet:

HAVA § 301(a)(1)(A)
The voting system shall:

(i) permit the voter to verify (in a private an independent manner) the votes selected by the voter on the ballot before the ballot is cast and counted; (ii) provide the voter with the opportunity (in a private and independent manner) to change the ballot or correct any error before the ballot is cast and counted (including the opportunity to correct the error through the issuance of a replacement ballot if the voter was otherwise unable to change the ballot or correct any error); and (iii)if the voter selects votes for more than one candidate for a single office – (I) notify the voter than the voter has selected more than one candidate for a single office on the ballot; (II) notify the voter before the ballot is cast and counted of the effect of casting multiple votes for the office; and, (III) provide the voter with the opportunity to correct the ballot before the ballot is cast and counted
HAVA § 301(a)(1)(C)
The voting system shall ensure than any notification required under this paragraph preserves the privacy of the voter and the confidentiality of the ballot.
HAVA § 301(a)(3)(A)
The voting system shall— (A) be accessible for individuals with disabilities, including nonvisual accessibility for the blind and visually impaired, in a manner that provides the same opportunity for access and participation (including privacy and independence) as other voters
Staff Analysis
The DVS voting system components meet these requirements through the inclusion of options for ADA-compliant voting machines municipalities can choose to employ.

Recommendations

Staff has reviewed the application materials, including the technical data package and testing lab report, and examined the results from the functional and modeming test campaigns to determine if these systems are compliant with both state and federal certification laws. Democracy Suite 5.17 and Democracy Suite 5.17S comply with all applicable state and federal requirements. The components of these voting systems met all standards over three mock elections and staff determined they can successfully run a transparent, fair, and secure election in compliance with Wisconsin Statutes. The systems also allow access to the electoral process for individuals with disabilities with the inclusion of the accessible features present on the ICE and ICX hardware components.

1. WEC staff recommends approval of Dominion Voting Systems' Democracy Suite 5.17 and Democracy Suite 5.17S and the components of these systems, set forth in Appendix C. These voting systems accurately completed the three mock elections and were able to accommodate the voting requirements of the Wisconsin election process. This recommendation is based on the EAC certification/documentation, the VSTL test reports provided by Pro V&V and on the Democracy Suite 5.17S system successfully completing Wisconsin functional testing as dictated by the *Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin*.

2. WEC staff recommends that as a continuing condition of the WEC's approval, Dominion Voting Systems may not impose customer deadlines contrary to requirements provided in Wisconsin Statutes, as determined

by the WEC. In order to enforce this provision, local jurisdictions purchasing Dominion Voting Systems equipment shall also include such a provision in their respective purchase contract or amend their contract if such a provision does not currently exist.

3. WEC staff recommends that as a continuing condition of the WEC's approval, that voting systems purchased and installed as part of Democracy Suite 5.17 and Democracy Suite 5.17S be configured in the same manner in which they were tested, subject to verification by the Commission or its designee. Once installed, the configuration must remain the same and may not be altered by Dominion Voting Systems nor by state, county, or municipal officials except as approved by the Commission.

4. WEC staff recommends that election inspectors continue to check both the write-in bin, where applicable, and main ballot bin for validly cast write-in votes after the close of polls in each election, and not rely upon the optional write-in report.

5. WEC staff recommends that any absentee ballot returned by the tabulation equipment with an overvote or crossover vote notification must be reviewed by election inspectors prior to being overridden or remade. If necessary, ballots must be remade pursuant to approved procedures listed in the Election Day and Election Administration manuals.

6. WEC staff recommends that any absentee ballot returned which has been marked with non-black ink be remade by election inspectors prior to any attempt at processing on the tabulation equipment.

7. WEC staff recommends that ballots marked with the ImageCast Evolution ballot marking device, the ImageCast X ballot marking device, or ImageCast X with voter-verified paper audit trail be included as part of the pre-election public test in jurisdictions where those hardware components are used.

8. WEC staff recommends clerks and election inspectors ensure that external modems are secured prior to, during, and after every election, with proper chain of custody documentation utilized.

9. WEC staff recommends that, as a result of the components tested and to reflect the equipment currently used by Wisconsin counties and municipalities, only the Pantech modem be approved for use in jurisdictions that transmit unofficial results wirelessly and only the MultiTech modem be approved for use in jurisdictions that transmit unofficial results via an analog phone line.

10. WEC staff recommends that as a continuing condition of the WEC's approval, that this system must always be configured to include the following options:

    a. Automatic rejection of crossover and overvoted ballots with or without the option to override.
    b. Automatic rejection of all improper ballots except blank ballots.
    c. Digital ballot images shall be captured for all ballots tabulated by the system.
    d. Automatically return marked ballots to the voter for physical review prior to casting when marked using the ICE tabulator BMD function.
    e. Provide visual warning messages, utilizing Commission approved language, to voters when overvotes and crossover votes are detected.
    f. Voter ballot activation cards used as part of the ICX BMD or VVPAT be reprogrammed after each use and set to expire after a maximum of one hour.

11. As part of US EAC certificate: DVS-DemSuite5.17, only equipment included in this certificate can be used together to conduct an election in Wisconsin. Previous versions that were approved for use by the former

Elections Board and the G.A.B. are not compatible with the new Dominion Voting Systems voting system and are not to be used together with the equipment seeking approval by the WEC, as this would void the US EAC certificate. If a jurisdiction upgrades to Democracy Suite 5.17, it needs to upgrade each and every component of the voting system to the requirements of what is approved herein. Likewise, if a jurisdiction upgrades to Democracy Suite 5.17S, it needs to upgrade each and every component of the voting system to the requirements of what is approved herein.

12. WEC staff recommends that as a condition of approval, Dominion Voting Systems shall abide by applicable Wisconsin public records laws. If, pursuant to a proper public records request, the customer receives a request for matters that might be proprietary or confidential, customer will notify Dominion Voting Systems, providing the same with the opportunity to either provide customer with the record that is requested for release to the requestor, or shall advise customer that Dominion Voting Systems objects to the release of the information, and provide the legal and factual basis of the objection. If for any reason, the customer concludes that customer is obligated to provide such records, Dominion Voting Systems shall provide such records immediately upon customer's request. Dominion Voting Systems shall negotiate and specify retention and public records production costs in writing with customers prior to charging said fees. In absence of meeting such conditions of approval, Dominion Voting Systems shall not charge customer for work performed pursuant to a proper public records request, except for the "actual, necessary, and direct" charge of responding to the records request, as that is defined and interpreted in Wisconsin law, plus shipping, handling, and chain of custody.

13. The Wisconsin application for approval contains a condition that requires the vendor to reimburse the WEC for all costs associated with the testing campaign and certification process. Dominion Voting Systems agreed to this requirement on the applications submitted to WEC on June 30, 2023, requesting the approval of Democracy Suite 5.17 and Democracy Suite 5.17S.

Proposed Motion

MOTION: The Wisconsin Elections Commission adopts the staff's recommendations for approval of the Dominion Voting Systems Application for Approval of Democracy Suite 5.17 in compliance with US EAC certificate DVS-DemSuite5.17 including the conditions described above, and the Dominion Voting Systems Application for Approval of Democracy Suite 5.17S including the conditions described above.

Appendices

- Appendix A: Wisconsin Statutes § 5.91
- Appendix B: Wisconsin Administrative Code Ch. EL 7
- Appendix C: US-EAC Certificate of Conformance / Scope of Certification
- Appendix D: Sample Voter Information Screens
- Appendix E: Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin
- Appendix F: Wisconsin Voting Equipment Review Panel Feedback

Appendix A: Wisconsin Statutes § 5.91

5.91 Requisites for approval of ballots, devices and equipment. No ballot, voting device, automatic tabulating equipment, or related equipment and materials to be used in an electronic voting system may be utilized in this state unless it is certified by the commission. The commission may revoke its certification of any ballot, device, equipment, or materials at any time for cause. The commission may certify any such voting device, automatic tabulating equipment, or related equipment or materials regardless of whether any such item is approved by the federal election assistance commission, but the commission may not certify any ballot, device, equipment, or material to be used in an electronic voting system unless it fulfills the following requirements:

(1) It enables an elector to vote in secrecy and to select the party for which an elector will vote in secrecy at a partisan primary election.

(3) Except in primary elections, it enables an elector to vote for a ticket selected in part from the nominees of one party, and in part from the nominees of other parties, and in part from independent candidates and in part of candidates whose names are written in by the elector.

(4) It enables an elector to vote for a ticket of his or her own selection for any person for any office for whom he or she may desire to vote whenever write-in votes are permitted.

(5) It accommodates all referenda to be submitted to the electors in the form provided by law.

(6) The voting device or machine permits an elector in a primary election to vote for the candidates of the recognized political party of his or her choice, and the automatic tabulating equipment or machine rejects any ballot on which votes are cast in the primary of more than one recognized political party, except where a party designation is made or where an elector casts write-in votes for candidates of more than one party on a ballot that is distributed to the elector.

(7) It permits an elector to vote at an election for all persons and offices for whom and for which the elector is lawfully entitled to vote; to vote for as many persons for an office as the elector is entitled to vote for; to vote for or against any question upon which the elector is entitled to vote; and it rejects all choices recorded on a ballot for an office or a measure if the number of choices exceeds the number which an elector is entitled to vote for on such office or on such measure, except where an elector casts excess write-in votes upon a ballot that is distributed to the elector.

(8) It permits an elector, at a presidential or gubernatorial election, by one action to vote for the candidates of a party for president and vice president or for governor and lieutenant governor, respectively.

(9) It prevents an elector from voting for the same person more than once for the same office, except where an elector casts excess write-in votes upon a ballot that is distributed to the elector.

(10) It is suitably designed for the purpose used, of durable construction, and is usable safely, securely, efficiently and accurately in the conduct of elections and counting of ballots.

(11) It records correctly and counts accurately every vote properly cast and maintains a cumulative tally of the total votes cast that is retrievable in the event of a power outage, evacuation or malfunction so that the records of votes cast prior to the time that the problem occurs is preserved.

(12) It minimizes the possibility of disenfranchisement of electors as the result of failure to understand the method of operation or utilization or malfunction of the ballot, voting device, automatic tabulating equipment or related equipment or materials.
(13) The automatic tabulating equipment authorized for use in connection with the system includes a mechanism which makes the operator aware of whether the equipment is malfunctioning in such a way that an inaccurate tabulation of the votes could be obtained.
(14) It does not employ any mechanism by which a ballot is punched or punctured to record the votes cast by an elector.
(15) It permits an elector to privately verify the votes selected by the elector before casting his or her ballot.
(16) It provides an elector with the opportunity to change his or her votes and to correct any error or to obtain a replacement for a spoiled ballot prior to casting his or her ballot.
(17) Unless the ballot is counted at a central counting location, it includes a mechanism for notifying an elector who attempts to cast an excess number of votes for a single office that his or her votes for that office will not be counted, and provides the elector with an opportunity to correct his or her ballot or to receive and cast a replacement ballot.
(18) If the device consists of an electronic voting machine, it generates a complete, permanent paper record showing all votes cast by each elector, that is verifiable by the elector, by either visual or nonvisual means as appropriate, before the elector leaves the voting area, and that enables a manual count or recount of each vote cast by the elector.

Appendix B: Wisconsin Administrative Code, Chapter EL 7

APPROVAL OF ELECTRONIC VOTING EQUIPMENT

Note: Chapter ElBd 7 was renumbered chapter GAB 7 under s. 13.92 (4) (b) 1., Stats., and corrections made under s. 13.92 (4) (b) 7., Stats., Register April 2008 No. 628. **Chapter GAB 7 was renumbered Chapter EL 7 under s. 13.92 (4) (b) 1., Stats., Register June 2016 No. 726.**

EL 7.01 Application for approval of electronic voting system.

(1) An application for approval of an electronic voting system shall be accompanied by all of the following:

(a) A signed agreement that the vendor shall pay all costs, related to approval of the system, incurred by the elections commission, its designees and the vendor.

(b) Complete specifications for all hardware, firmware and software.

(c) All technical manuals and documentation related to the system.

(d) Complete instruction materials necessary for the operation of the equipment and a description of training available to users and purchasers.

(e) Reports from an independent testing authority accredited by the national association of state election directors (NASED) demonstrating that the voting system conforms to all the standards recommended by the federal elections commission.

(f) A signed agreement requiring that the vendor shall immediately notify the elections commission of any modification to the voting system and requiring that the vendor will not offer, for use, sale or lease, any modified voting system, if the elections commission notifies the vendor that the modifications require that the system be approved again.

(g) A list showing all the states and municipalities in which the system has been approved for use and the length of time that the equipment has been in use in those jurisdictions.

(2) The commission shall determine if the application is complete and, if it is, shall so notify the vendor in writing. If it is not complete, the elections commission shall so notify the vendor and shall detail any insufficiencies.

(3) If the application is complete, the vendor shall prepare the voting system for three mock elections, using offices, referenda questions and candidates provided by the elections commission.

History: Cr. Register, June, 2000, No. 534, eff. 7−1−00; **correction in (1) (a), (f), (2), (3) made under s. 13.92 (4) (b) 6., Stats., Register June 2016 No. 726.**

EL 7.02 Agency testing of electronic voting system.

(1) The elections commission shall conduct a test of a voting system, submitted for approval under s. EL 7.01, to ensure that it meets the criteria set out in s. 5.91, Stats. The test shall be conducted using a mock election for the partisan primary, a mock general election with both a presidential and gubernatorial vote, and a mock nonpartisan election combined with a presidential preference vote.

(2) The elections commission may use a panel of local election officials and electors to assist in its review of the voting system.

(3) The elections commission may require that the voting system be used in an actual election as a condition of approval.

History: Cr. Register, June, 2000, No. 534, eff. 7−1−00; **correction in (1) to (3) made under s. 13.92 (4) (b) 6., Stats., and correction in (1) made under s. 13.92 (4) (b) 7., Stats., Register June 2016 No. 726.**

EL 7.03 Continuing approval of electronic voting system.

(1) The elections commission may revoke the approval of any existing electronic voting system if it does not comply with the provisions of this chapter. As a condition of maintaining the elections commission's approval for the use of the voting system, the vendor shall inform the elections commission of all changes in the hardware, firmware and software and all jurisdictions using the voting system.

(2) The vendor shall, at its own expense, furnish, to an agent approved by the elections commission, for placement in escrow, a copy of the programs, documentation and source code used for any election in the state.

(3) The electronic voting system must be capable of transferring the data contained in the system to an electronic recording medium, pursuant to the provisions of s. 7.23, Stats.

(4) The vendor shall ensure that election results can be exported on election night into a statewide database developed by the elections commission.

(5) For good cause shown, the elections commission may exempt any electronic voting system from strict compliance with this chapter.

History: Cr. Register, June, 2000, No. 534, eff. 7−1−00; **correction in (1), (4), (5) made under s. 13.92 (4) (b) 6., Stats. and corrections in (5) made under s. 13.92 (4) (b) 7., Stats., and s. 35.17, Stats., Register June 2016 No. 726.**

Appendix C: US-EAC Certificate of Conformance / Scope of Certification

United States Election Assistance Commission

VVSG 2005 VER. I

Certificate of Conformance

Dominion Voting Systems
Democracy Suite 5.17

The voting system identified on this certificate has been evaluated at an accredited voting system testing laboratory for conformance to the *Voluntary Voting System Guidelines Version 1.0 (VVSG 1.0)* . Components evaluated for this certification are detailed in the attached Scope of Certification document. This certificate applies only to the specific version and release of the product in its evaluated configuration. The evaluation has been verified by the EAC in accordance with the provisions of the EAC *Voting System Testing* and *Certification Program Manual* and the conclusions of the testing laboratory in the test report are consistent with the evidence adduced. This certificate is not an endorsement of the product by any agency of the U.S. Government and no warranty of the product is either expressed or implied.

Product Name: Democracy Suite

Model or Version: 5.17

Name of VSTL: Pro V&V

EAC Certification Number: DVS-DemSuite5.17

Date Issued: March, 16 2023

Steven M. Frid
Executive Director

Scope of Certification Attached

Manufacturer: *Dominion Voting Systems (DVS)* **Laboratory:** *Pro V&V*
System Name: *Democracy Suite 5.17* **Standard:** *VVSG 1.0*
Certificate: *DVS-DemSuite5.17* **Date:** *3/15/23*

Scope of Certification

This document describes the scope of the validation and certification of the system defined above. Any use, configuration changes, revision changes, additions or subtractions from the described system are not included in this evaluation.

Significance of EAC Certification

An EAC certification is an official recognition that a voting system (in a specific configuration or configurations) has been tested to and has met an identified set of Federal voting system standards. An EAC certification is **not**:

- An endorsement of a Manufacturer, voting system, or any of the system's components.
- A Federal warranty of the voting system or any of its components.
- A determination that a voting system, when fielded, will be operated in a manner that meets all HAVA requirements.
- A substitute for State or local certification and testing.
- A determination that the system is ready for use in an election.
- A determination that any particular component of a certified system is itself certified for use outside the certified configuration.

Representation of EAC Certification

Manufacturers may not represent or imply that a voting system is certified unless it has received a Certificate of Conformance for that system. Statements regarding EAC certification in brochures, on Web sites, on displays, and in advertising/sales literature must be made solely in reference to specific systems. Any action by a Manufacturer to suggest EAC endorsement of its product or organization is strictly prohibited and may result in a Manufacturer's suspension or other action pursuant to Federal civil and criminal law.

System Overview:

The D-Suite 5.17 Voting System is a paper-based optical scan voting consisting of the following major components: The Election Management System (EMS), the ImageCast Central (ICC), the ImageCast Precinct (ICP and ICP2), the ImageCast Evolution (ICE), and the ImageCast X ballot marking device (BMD). The D-Suite 5.17 Voting System configuration is a modification from the EAC approved D-Suite 5.5-D system configuration.

System Modifications:

The list below includes changes between this Democracy Suite 5.17 system and the baseline of the Democracy Suite 5.5-D Voting System:

GENERAL SYSTEM CHANGES

- System and security updates to Democracy Suite:
  - Upgrade to Windows Server 2019 and SQL Server 2019.
  - New tool for performing automated hardening procedure of all Windows-based components.
  - Additional encryption of election databases on ICE, ICP2 and ICX
  - ICX Smart Card Mutual Authentication and Secure Messaging
- Added support for Provisional Voting with ICX-BMD and QR ballots.
- Added support for ICX BMD to produce a Uniform Ballot.
- Added additional election-specific information to the barcode on paper ballots.
- Added support for Batch and Summary Cards in EED and ICC.
- Added ability in EED to configure the number of columns a contest should occupy on the ICX screen.
- Improved pseudo random number algorithm.
- Added ability to export server certificates for previously imported encrypted projects.

EMS

- System and security updates to the EMS system:
  - Expanding the use of Trusted Certificates
  - Additional Software Encryption of the SQL Database
  - Blocked auto-play for all external media.
- Modified UI for managing tabulators.
- Election Event Designer updates:
  - Added support for creating watermark images for paper ballot header, footer, and stubs.
  - Added information about status of election files in the Tabulator list to indicate whether election media has been programmed or needs to be re-programmed.
  - Improvement to election file generation
- Results Tally & Reporting updates:
  - Updated reporting module.
  - Added option to redact low turnout by precinct and/or counting group from CVR export for Primary elections.

ADJ

- Added an option to prevent adjudicators from adjudicating contests which do not meet selected out-stack conditions for the project.
- New Adjudication Activity Log Report and Export.
- Added ability to perform Database Back-ups and Maintenance Procedure.

ICC

- Add a configuration setting to force save both sides of the ballot for single sided ballots.
- Poll ID field extended from 6 characters in length to 10.
- Added a Status/Interrupt Report
- Update application to support HiPro Firmware version 1.0.1074

ICE

- Ability to display instructional text or contest heading on ICE Screen

ICP2

- Introduced option to specify a different passcode for the Poll Close action.
- Added a warning during poll-closing procedure reminding the Poll Worker to ensure that the Auxiliary Bin is empty.
- Added monitoring of the printer sensor to ensure the printer head is in the correct place.
- Prevented the Calibration Buttons from lighting up after the Poll has opened.

ICX

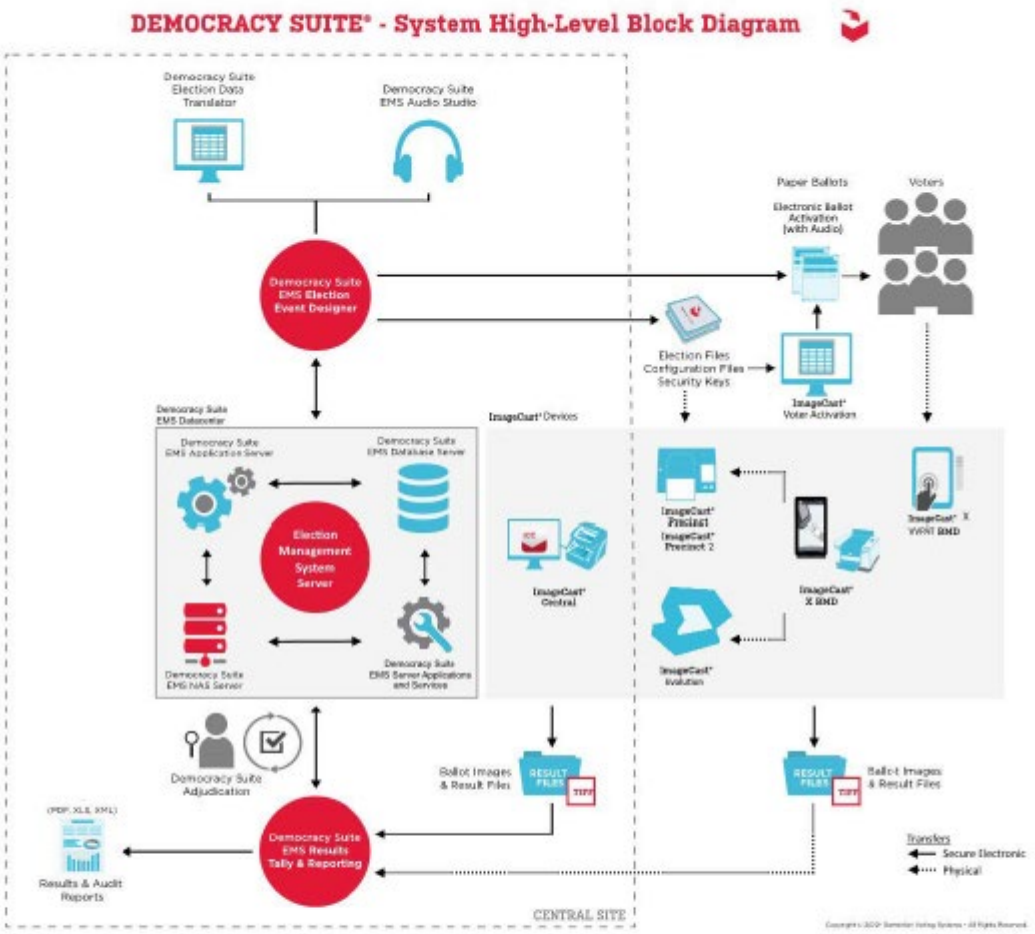
- System and Security updates to the ICX product:
  - Upgrade to Android version 8.1
  - Obfuscation of Source Code
  - Added tabulator serial number to the result files.
  - Support for Poll Worker and Technician Card expiration date
  - Additional USB models added to list of accepted devices.
- Added support for following BMD Printers:
  - Avision AP3061
  - HP M404dn
  - HP 4001dn
- Ability to choose if the text size selected on the screen is printed on the BMD QR ballot or not.
- Allow Poll Worker to cast a fleeing voter ballot.
- New Firmware version 169 for VVPAT V1 and V1C
- Updates to printed content for VVPAT:
  - Option to not print Total Ballots Cast in report footer.
  - Option to print Party information for Primaries.
  - Precinct ID changed to Precinct Name
- Reduced amount of paper used when printing on VVPAT.
- Removed ability to print Zero Report after ballots have been cast in VVPAT BMD mode.

Language capability:

This section provides information describing the languages supported by the various components of the system.

Language	ICE	ICP	ICP2	ICX
Alaska Native	Yes, if using Latin alphabet	Yes	No	No
Apache	Audio only	Audio only	No	No
Bengali	Yes	Yes	Yes	Yes
Chinese	Yes	Yes	Yes	Yes
English	Yes	Yes	Yes	Yes
Eskimo	Yes, if using Latin alphabet	Yes	No	No
Filipino	Yes, if using Latin alphabet	Yes	Yes	No
French	Yes	Yes	No	Yes
Hindi	Yes	Audio only	Yes	Yes
Japanese	Yes	Yes	Yes	Yes
Jicarilla	Audio only	Audio only	No	No
Keres	Audio only	Audio only	No	No
Khmer	Yes	Audio only	No	No
Korean	Yes	Yes	Yes	Yes
Navajo	Audio only	Audio only	No	No
Seminole	Audio only	Audio only	No	No
Spanish	Yes	Yes	Yes	Yes
Tagalog	No	No	No	Yes
Thai	Yes	Audio only	Yes	Yes
Towa	Audio only	Audio only	No	No
Ute	Audio only	Audio only	No	No
Vietnamese	Yes	Yes	Yes	Yes
Yuman	Audio only	Audio only	No	No

Democracy Suite 5.17 System Diagram



Components Included:

This section provides information describing the components and revision level of the primary components included in this Certification.

Voting System Software Components:

System Component	Software or Firmware Version	Operating System or COTS	Comments
EMS Election Event Designer (EED)	5.17.17.1	Windows 10 Pro	EMS
EMS Results Tally and Reporting (RTR)	5.17.17.1	Windows 10 Pro	EMS
EMS Application Server	5.17.17.1	Windows Server 19 Windows 10 Pro	EMS
EMS File System Service (FSS)	5.17.17.1	Window 10 Pro	EMS
EMS Audio Studio (AS)	5.17.17.1	Windows 10 Pro	EMS
EMS Data Center Manager (DCM)	5.17.17.1	Windows Server 19 Windows 10 Pro	EMS
EMS Election Data Translator (EDT)	5.17.17.1	Windows 10 Pro	EMS
ImageCast Voter Activation (ICVA)	5.17.17.1	Windows 10 Pro	EMS
EMS Adjudication (ADJ)	5.17.14.1	Windows 10 Pro	EMS
File System Server	5.17.17.1	Windows Server 19 Windows 10 Pro	EMS
Database Server	5.17.17.1	Windows Server 19 Windows 10 Pro	EMS
EMS Logger	5.17.17.1	Windows Server 19 Windows 10 Pro	EMS
NAS Server	5.17.17.1	Windows Server 19 Windows 10 Pro	EMS
EMS Adjudication Services	5.17.14.1	Windows Server 19 Windows 10 Pro	EMS
Smart Card Helper Service (SCHS)	5.17.17.1	Windows 10 Pro	EMS
Election Firmware	5.17.15.3	uClinux	ICP
ICP2 Application	5.17.15.1	Linux	ICP2
ICE Application	5.17.15.1	Ubuntu Linux	ICE
ImageCast Central Application	5.17.15.1	Windows 10 Pro	ICC
ICX Application	5.17.17.1	Android 8.1.0-2.2.4	ICX

Voting System Platform:

System Component	Version	Operating System or COTS	Comments
Microsoft Windows Server	2019	Unmodified COTS	EMS Server SW Component
Microsoft Windows	10 Professional	Unmodified COTS	EMS Client/Server SW Component
.NET Framework	3.5	Unmodified COTS	EMS Client/Server SW Component
.NET Framework	4.8	Unmodified COTS	EMS Client/Server SW Component
Microsoft Visual C++ 2015 Redistributable	2015	Unmodified COTS	EMS Client/Server SW Component
Microsoft Visual C++ 2013 Redistributable	2013	Unmodified COTS	EMS Client/Server SW Component

System Component	Version	Operating System or COTS	Comments
Java SE Runtime Environment	6.0 Update 20 or later	Unmodified COTS	EMS Client/Server SW Component
Microsoft SQL Server 2019 Standard SP2	2019 Standard SP2	Unmodified COTS	EMS Client/Server SW Component
Microsoft SQL Server 2019 Express with Advanced Services	2019 Express	Unmodified COTS	EMS Client/Server SW Component
Cepstral Voices	6.2.3	Unmodified COTS	EMS Client/Server SW Component
Arial Narrow Fonts	2.37a	Unmodified COTS	EMS Client/Server SW Component
Dallas 1-Wire Device Driver	4.05	Unmodified COTS	EMS Client/Server SW Component
Adobe Reader DC	AcrobatDC	Unmodified COTS	EMS Client/Server SW Component
Microsoft Access Database Engine	2010	Unmodified COTS	EMS Client/Server SW Component
Open XML SDK 2.0 for Microsoft Office	2.0	Unmodified COTS	EMS Client/Server SW Component
Infragistics NetAdvantage Win Forms	2011Vol. 1	Unmodified COTS	EMS SW Platform
Infragistics NetAdvantage Win Ultimate	2013 Vol. 1	Unmodified COTS	EMS SW Platform
Infragistics NetAdvantage WPF	2012 Vol. 1	Unmodified COTS	EMS SW Platform
TX Text Control Library for .NET	16.0	Unmodified COTS	EMS SW Platform
SOX	14.3.1	Unmodified COTS	EMS SW Platform
NLog	1.0.0.505	Unmodified COTS	EMS SW Platform
iTextSharp	5.0.5	Unmodified COTS	EMS SW Platform
CLR Security	2.3	Unmodified COTS	EMS SW Platform
ICSharpCode SharpZipLib	0.86.0	Unmodified COTS	EMS SW Platform
ISONewspaper	30.4	Unmodified COTS	EMS SW Platform
OpenSSL	1.0.2K	Unmodified COTS	EMS SW Platform
OpenSSL FIPS Object Module	2.0.14	Unmodified COTS	EMS SW Platform
SQLite	1.0.116	Unmodified COTS	EMS SW Platform
Lame	3.99.4	Unmodified COTS	EMS SW Platform
Speex	1.0.4	Unmodified COTS	EMS SW Platform
Ghostscript	9.54	Unmodified COTS	EMS SW Platform
One Wire API for .NET	4.0.2.0	Unmodified COTS	EMS SW Platform
Microsoft Expression Drawing;	3.0.0	Unmodified COTS	EMS SW Platform
MS Prism	4.0.0	Unmodified COTS	EMS SW Platform
MS Prism Unity Extensions	4.0.0	Unmodified COTS	EMS SW Platform
MS Build Community Tasks	1.4	Unmodified COTS	EMS SW Platform
MS Build Extension Pack	4.0.8.0	Unmodified COTS	EMS SW Platform
Enterprise Library	5.0	Unmodified COTS	EMS SW Platform
Entity Framework	6.1.3	Unmodified COTS	EMS SW Platform
NASM Assembler	2.12.02	Unmodified COTS	EMS SW Platform
newtonsoft.ison	13.01	Unmodified COTS	EMS SW Platform
Nlog	1.0.0.505	Unmodified COTS	EMS SW Platform
Ogg Vorbis decoder - oggdec	1.10.1	Unmodified COTS	EMS SW Platform
Ogg Vorbis encoder - oggenc2	2.88	Unmodified COTS	EMS SW Platform
PDFPrintingNet	4.8.2.0	Unmodified COTS	EMS SW Platform
Prism.Mvvm	1.1.1	Unmodified COTS	EMS SW Platform

System Component	Version	Operating System or COTS	Comments
Sox	14.3.1	Unmodified COTS	EMS SW Platform
SQLSysClrTypes.msi	Microsoft System CLR Types for SQL Server 2014	Unmodified COTS	EMS SW Platform
SSH.Net	2014.4.6.Beta2	Unmodified COTS	EMS SW Platform
Strawberry Perl	5.24.1.1	Unmodified COTS	EMS SW Platform
System Windows.Interactivity. WPF	2.0.20525	Unmodified COTS	EMS SW Platform
Toggle Switch Control Library	1.1.1	Unmodified COTS	EMS SW Platform
TreeViewEx	0.1.0.0	Unmodified COTS	EMS SW Platform
twaindsm-2.3.0.win.bin.zip	2.3.0	Unmodified COTS	EMS SW Platform
TX Text Control 16.0.NET	16.0	Unmodified COTS	EMS SW Platform
Visual Studio 2019 Professional	2019 Professional	Unmodified COTS	EMS SW Platform
Wix	3.11	Unmodified COTS	EMS SW Platform
Wix toolset Visual Studio Extension	3.11.2	Unmodified COTS	EMS SW Platform
Spreadsheetlight	3.4.3	Unmodified COTS	EMS SW Platform
Open SSL	1.0.2K	Unmodified COTS	ICP
OpenSSL FIPS Object Module	2.0.10	Unmodified COTS	ICP
Colilo	200400221	Unmodified COTS	ICP
uClinux tools	20040603	Unmodified COTS	ICP
uClinux	20070130	Modified COTS	ICP
Kernel (Linux)	2.6.30.9-dvs-36	Modified COTS	ICE
U-Boot	1.3.4	Modified COTS	ICE
BusyBox	1.20.2	Unmodified COTS	ICE
e2fsprogs	1.42.4	Unmodified COTS	ICE
Expat XML Parser	2.1.0	Unmodified COTS	ICE
Fontconfig	2.9.0	Unmodified COTS	ICE
Freetype	2.4.9	Unmodified COTS	ICE
I²C Tools for Linux	3.1.0	Unmodified COTS	ICE
JPEG library	8d	Unmodified COTS	ICE
libogg	1.3.0	Unmodified COTS	ICE
libPNG	1.5.10	Unmodified COTS	ICE
libusb	1.0.8	Unmodified COTS	ICE
libusb-compat	0.1.3	Unmodified COTS	ICE
openssl	1.0.2k	Unmodified COTS	ICE
openssl-fips	2.0.10	Unmodified COTS	ICE
PPP	2.4.5	Unmodified COTS	ICE
quazip	0.7.6	Unmodified COTS	ICE
Qt Everywhere Linux	4.7.3	Unmodified COTS	ICE
skell	1.19	Unmodified COTS	ICE
SoundTouch	1.6.0	Unmodified COTS	ICE
speex	1.2rc1	Unmodified COTS	ICE
SQLite	3.7.13	Unmodified COTS	ICE
Sysfs Utilities	2.1.0	Unmodified COTS	ICE
TIFF library	4.0.1	Unmodified COTS	ICE
timezone	2012b	Unmodified COTS	ICE
USB ModeSwitch	1.2.4	Unmodified COTS	ICE
zlib	1.2.7	Unmodified COTS	ICE
Kernel	4.9.11	Modified COTS	ICP2
U-Boot	2017.03	Modified COTS	ICP2

System Component	Version	Operating System or COTS	Comments
Logback	1.1.1-12	Unmodified COTS	ICX SW
Speex	1.2rc1	Unmodified COTS	ICX SW
GreenDAO	2.2.1	Unmodified COTS	ICX SW
GSON	2.8.4	Unmodified COTS	ICX SW
Zxing Core	3.4.0	Modified COTS	ICX SW
SoundTouch	1.9.2	Modified COTS	ICX SW
Android	8.1	Modified COTS	ICX SW
OGG	1.3.2	Unmodified COTS	ICX SW
SLF4J	1.7.29	Unmodified COTS	ICX SW
USB Serial	3.2	Unmodified COTS	ICX SW
OpenSSL FIPS Object Module	2.0.10	Unmodified COTS	ICX SW Build Library
OpenSSL	1.0.2K	Unmodified COTS	ICC SW Build Library
OpenSSL FIPS Object Module	2.0.14	Unmodified COTS	ICC SW Build Library
1-Wire Driver (x86)	4.05	Unmodified COTS	ICC Runtime SW
1-Wire Driver (x64)	4.05	Unmodified COTS	ICC Runtime SW
Canon DR-G1130 TWAIN Driver	1.2 SP6	Unmodified COTS	ICC Runtime SW
Canon DR-G2140 TWAIN Driver	1.1.11807.24001 SP2	Unmodified COTS	ICC Runtime SW
Canon M160ii	M160II_DRIT_V12S P6	Unmodified COTS	ICC Runtime SW
Canon DR-M260 TWAIN Driver,	1.1.11803.19001 SP2	Unmodified COTS	ICC Runtime SW
InoTec HiPro 821 TWAIN Driver	1.3.0.4	Unmodified COTS	ICC Runtime SW
Visual C++ 2015 Redistributable (x86)	2015	Unmodified COTS	ICC Runtime SW
Microsoft Windows 10 Professional x64	10	Unmodified COTS	ICC Runtime SW
Strawberry Perl	5.24.1.1	Unmodified COTS	ICC Runtime SW
Visual Studio 2019 Professional	2019	Unmodified COTS	ICC Runtime SW
Machine Configuration File (MCF)	5.17.15.1_20220920	Proprietary	ICX Configuration File
Device Configuration File (DCF)	5.17.9.1_20220916	Proprietary	ICP and ICC Configuration File
ICE Machine Behavior Settings	5.17.8.1_EAC_5.17_20220727	Proprietary	ICE Configuration
ICP2 Machine Behavior Settings	5.17.8.1_EAC_5.17_20220727	Proprietary	ICP2 Configuration

Hardware Components:

System Component	Hardware Version	Proprietary or COTS	Comments
ImageCast Precinct (ICP)	PCOS-320C	Proprietary	Precinct Scanner
ImageCast Precinct (ICP)	PCOS-320A	Proprietary	Precinct Scanner
ImageCast 2 Precinct (ICP2)	PCOS-330A	Proprietary	Precinct Scanner
ImageCast Evolution (ICE)	PCOS-410A	Proprietary	Precinct Scanner
ICP Ballot Box	BOX-330A	Proprietary	Ballot Box
ICP Ballot Box	ElectionSource IM-COLLAPSIBLE	Proprietary	Ballot Box
ICE Ballot Box	BOX-410A	Proprietary	Ballot Box
ICE Ballot Box	BOX-420A	Proprietary	Ballot Box
ICP2 Ballot Box	BOX-350A	Proprietary	Ballot Box
ICP2 Ballot Box	ElectionSource IM-COLLAPSIBLE	Proprietary	Ballot Box
ICX UPS Inline EMI Filter	1.0	Proprietary	EMI Filter
ICX Tablet (Classic)	aValue 15" Tablet (SID-15V)	COTS	Ballot Marking Device
ICX Tablet (Classic)	aValue 21" Tablet (SID-21V)	COTS	Ballot Marking Device

System Component	Hardware Version	Proprietary or COTS	Comments
ICX Tablet (Prime)	aValue 21" Tablet (HID-21V) (Steel or Aluminum chassis)	COTS	Ballot Marking Device or Direct Recording Electronic
Thermal Printer (VVPAT)	KFI VRP3 V1 and V1C	COTS	Voter-verifiable paper audit trail (VVPAT)
Server	Dell PowerEdge R630	COTS	Standard Server
Server	Dell PowerEdge R640	COTS	Standard Server
ICC Workstation HW	Dell Optiplex 5270 All in One	COTS	
ICC Workstation HW	Dell OptiPlex 7440 All in One	COTS	
ICC Workstation HW	Dell OptiPlex 3050 All in One	COTS	
ICC Workstation HW	Dell OptiPlex 9030 All in One	COTS	
ICC Workstation HW	Dell OptiPlex 9020 All in One	COTS	
ICC Workstation HW	Dell OptiPlex 9010 All in One	COTS	
ICC Workstation HW	Dell Precision 3450 XE	COTS	
ICC Workstation HW	Dell Precision 3460 XE	COTS	
ICC Workstation HW	Dell Precision 3440 XE	COTS	
ICC Scanner	Canon imageFormula DR-G1130	COTS	Central Count Scanner
ICC Scanner	Canon imageFormula DR-M160 II	COTS	Central Count Scanner
ICC Scanner	Canon imageFormula DR-M260	COTS	Central Count Scanner
ICC Scanner	Canon imageFormula DR-G2140	COTS	Central Count Scanner
ICC Scanner	InoTec HiPro 821	COTS	Central Count Scanner
ICC Scanner	Dell Optiplex 7070	COTS	
ICC Scanner	Dell Optiplex 7060	COTS	
ICC Scanner	Dell Optiplex 7050	COTS	
ICC Scanner	Dell Optiplex XE3	COTS	
ICC Scanner	Dell Optiplex XE4	COTS	
ICC Scanner Monitor	Lenovo 10QXPAR1US	COTS	
ICC Scanner Monitor	Dell 2418HT Monitor	COTS	
ICC Scanner Monitor	Lenovo 11GCPAR1US	COTS	
ICC Scanner Monitor	Planar PCT2235	COTS	
Client Workstation HW and Express Server	Dell Precision 3430	COTS	
Client Workstation HW and Express Server	Dell Precision 3431	COTS	
Client Workstation HW and Express Server	Dell Precision T3420	COTS	
Client Workstation HW and Express Server	Dell Precision 3440 XE	COTS	
Client Workstation HW and Express Server	Dell Precision 3450 XE	COTS	
Client Workstation HW and Express Server	Dell Precision 3460 XE	COTS	
Client Workstation HW and Express Server	Dell Precision T1700	COTS	
Client Workstation HW and Express Server	Dell Precision T3420	COTS	
ImageCast Voter Activation (ICVA)	Dell Latitude 3330	COTS	
ImageCast Voter Activation (ICVA)	Dell Latitude 3420	COTS	
ImageCast Voter Activation (ICVA)	Dell Latitude 3410 (SSD)	COTS	

System Component	Hardware Version	Proprietary or COTS	Comments
ImageCast Voter Activation (ICVA)	Dell Latitude 3410 (HDD)	COTS	
ImageCast Voter Activation (ICVA)	Dell Latitude 3400	COTS	
ImageCast Voter Activation (ICVA)	Dell Latitude 3490	COTS	
ImageCast Voter Activation (ICVA)	Dell Latitude e3480	COTS	
ImageCast Voter Activation (ICVA)	Dell Latitude e3470	COTS	
ImageCast Voter Activation (ICVA)	Dell Latitude e7450	COTS	
ICX Printer and Report Printer	HP LaserJet Pro Printer M402dn	COTS	
ICX Printer	HP LaserJet Pro Printer M402dne	COTS	
ICX Printer	HP LaserJet Printer M501dn	COTS	
ICX Printer	HP LaserJet Printer 4001dn	COTS	
ICX Printer	HP LaserJet Printer M404dn	COTS	
ICX Printer	Avision Ap3061	COTS	
ICE Dual Monitor	AOC e1649FWU	COTS	
ICE Dual Monitor	Display Logic LM15.6-USB-DV.B	COTS	
Monitor	Dell Monitor P2422H	COTS	
Monitor	Dell Monitor P2419H	COTS	
Monitor	Dell P2417H	COTS	
iButton Programmer	Maxim iButton Programmer DS9490R# with DS1402-RP8+	COTS	
iBUtton	Dallas Maxim DS1963S-F5+	COTS	
UPS	Tripp Lite SMART1500RMXL2U	COTS	
UPS	APC SMT1500C Smart-UPS	COTS	
UPS	APC SMT1500 Smart-UPS	COTS	
UPS	APC BR1000G	COTS	
UPS	CyberPower PR1500LCD	COTS	
UPS	CyberPower PR1500LCD-VTVM	COTS	
Network Switch	Dell X1008	COTS	
Network Switch	Dell X1026	COTS	
Network Switch	Cisco 8-port Switch (CBS350-8T-E-2G)	COTS	
Network Switch	Cisco 24-port Switch (CBS350-24T-4G)	COTS	
Sip and Puff	Enabling Devices #972	COTS	
Headphones	Cyber Acoustics ACM-70 and 70B	COTS	
4-way Joystick Controller	S26	Modified COTS	
Rocker (Paddle) Switch	Enabling Device #971	COTS	
Rocker (Paddle) Switch	AbleNet 10033400 (2x)	COTS	
Rocker (Paddle) Switch Cable	Hosa Technology YMM-261 (for use with AbleNet switches)	COTS	
CF Card Dual-Slot Reader	Lexar USB 3.0	COTS	
CF Card Reader	Hoodman Steel USB 3.0 102015	COTS	

System Component	Hardware Version	Proprietary or COTS	Comments
CF Card Reader	Kingston FCR-HS4	COTS	
CF Card	Centon C4-CM-CF-16.4	COTS	
CF Card	RiTek RDCF8G-233XMCB2-i	COTS	
CF Card	SanDisk SDCFHS-008G	COTS	
SDHC Memory Card	Centon C4-ET-SDU-16.1	COTS	
SDHC Memory Card	Centon S4-ET-SDU3-8.1	COTS	
SDHC Memory Card	Centon S4-CM-SDHU1-8G-002	COTS	
SDHC Memory Card	Centon C4-CM-SDU1-8.2	COTS	
CF Card	SanDisk SDCFHS-004G	COTS	
USB Memory Device	Apricorn AEGIS Secure Key 3NX PN: ASK3-NX-128GB	COTS	
USB Memory Device	Apricorn AEGIS Secure Key 3NX PN: ASK3-NX-32GB	COTS	
USB Memory Device	Centon (BiCS4) PN: C4-CT-U3P2-16.3	COTS	
USB Memory Device	Centon S4-CM-U3P2-16.1	COTS	
USB Memory Device	Apacer EH353-M APHA016GAG0CG-3TM	COTS	
USB Memory Device	Centon (BiCS4) PN: C4-CT-U3P2-8.3	COTS	
USB Memory Device	Centon S4-CM-U3P2-8.1	COTS	
USB Memory Device	Apacer EH353-M APHA008GAG0CG-3TM	COTS	
USB Memory Device	o USB Memory Device (4GB): Verbatim 97087	COTS	
ATI - Serial	ATI handset	Proprietary	
ATI- USB	ATI-USB handset	Proprietary	
ACS PC-Linked Smart Card Reader	ACR38U	COTS	
ACS PC-Linked Smart Card Reader	ACR39U	COTS	
Smart Card Reader	HID Global Omnikey 3121	COTS	

System Limitations

This table depicts the limits the system has been tested and certified to meet.

Characteristic	Limiting Component	Limit	Component
Ballot positions	Ballot	462**/292*	22 in. Ballot
Precincts in an election	EMS	1000; 250	Memory, Standard; Express
Contests in an election	EMS	1000; 250	Memory, Standard; Express
Candidates/Counters in an election	EMS	10000; 2500	Memory, Standard; Express
Candidates/Counters in a precinct	Ballot	462**/240*	22 in. Ballot
Candidates/Counters in a tabulator	Tabulators	10000; 2500	Memory, Standard; Express
Ballot Styles in an election	Tabulators	3000; 750	Memory, Standard; Express
Ballot IDs in a tabulator	ICP	200	Memory, Both EMS
Contests in a ballot style	ICX BMD Ballot	156**/38*	14 in. Ballot, Both EMS
Candidates in a contest	Ballot	231**/240*	22 in. Ballot, Both EMS
Ballot styles in a precinct	Tabulators	5	Memory, Both EMS
Number of political parties	Tabulators	30	Memory, Both EMS
"Vote for" in a contest	Ballot	30**/24*	22 in. Ballot, Both EMS
Supported languages in an election	Tabulators	5	Memory, Both EMS

* Reflects the system limit for a ballot printed in landscape.

** Reflects the system limit for a ballot printed in portrait.

Functionality

VVSG Supported Functionality Declaration

Feature/Characteristic	Yes/No	Comment
Voter Verified Paper Audit Trails		
VVPAT	YES	
Accessibility		
Forward Approach	YES	
Parallel (Side) Approach	YES	
Closed Primary		
Primary: Closed	YES	
Open Primary		
Primary: Open supported)	YES	
Partisan & Non-Partisan:		
Partisan & Non-Partisan: Vote for 1 of N race	YES	
Partisan & Non-Partisan: Multi-member ("vote for N of M") board races	YES	
Partisan & Non-Partisan: "vote for 1" race with a single candidate and write-in voting	YES	
Partisan & Non-Partisan "vote for 1" race with no declared candidates and write-in voting	YES	
Write-In Voting:		
Write-in Voting: System default is a voting position identified for write-ins.	YES	
Write-in Voting: Without selecting a write in position.	NO	
Write-in: With No Declared Candidates	YES	
Write-in: Identification of write-ins for resolution at central count	YES	
Primary Presidential Delegation Nominations & Slates:		
Primary Presidential Delegation Nominations: Displayed delegate slates for each presidential party	YES	
Slate & Group Voting: one selection votes the slate.	YES	
Ballot Rotation:		
Rotation of Names within an Office; define all supported rotation methods for location on the ballot and vote tabulation/reporting	YES	
Straight Party Voting:		
Straight Party: A single selection for partisan races in a general election	YES	
Straight Party: Vote for each candidate individually	YES	
Straight Party: Modify straight party selections with crossover votes	YES	
Straight Party: A race without a candidate for one party	YES	
Straight Party: "N of M race (where "N">1)	YES	
Straight Party: Excludes a partisan contest from the straight party selection	YES	
Cross-Party Endorsement:		

Feature/Characteristic	Yes/No	Comment
Cross party endorsements, multiple parties endorse one candidate.	NO	
Split Precincts:		
Split Precincts: Multiple ballot styles	YES	
Split Precincts: P & M system support splits with correct contests and ballot identification of each split	YES	
Split Precincts: DRE matches voter to all applicable races.	YES	
Split Precincts: Reporting of voter counts (# of voters) to the precinct split level; Reporting of vote totals is to the precinct level	YES	
Vote N of M:		
Vote for N of M: Counts each selected candidate, if the maximum is not exceeded.	YES	
Vote for N of M: Invalidates all candidates in an overvote (paper)	YES	
Recall Issues, with options:		
Recall Issues with Options: Simple Yes/No with separate race/election. (Vote Yes or No Question)	YES	
Recall Issues with Options: Retain is the first option, Replacement candidate for the second or more options (Vote 1 of M)	NO	
Recall Issues with Options: Two contests with access to a second contest conditional upon a specific vote in contest one. (Must vote Yes to vote in 2nd contest.)	NO	
Recall Issues with Options: Two contests with access to a second contest conditional upon any vote in contest one. (Must vote Yes to vote in 2nd contest.)	NO	
Cumulative Voting		
Cumulative Voting: Voters are permitted to cast, as many votes as there are seats to be filled for one or more candidates. Voters are not limited to giving only one vote to a candidate. Instead, they can put multiple votes on one or more candidate.	NO	
Ranked Order Voting		
Ranked Order Voting: Voters can write in a ranked vote.	NO	
Ranked Order Voting: A ballot stops being counting when all ranked choices have been eliminated	NO	
Ranked Order Voting: A ballot with a skipped rank counts the vote for the next rank.	NO	

Feature/Characteristic	Yes/No	Comment
Ranked Order Voting: Voters rank candidates in a contest in order of choice. A candidate receiving a majority of the first-choice votes wins. If no candidate receives a majority of first choice votes, the last place candidate is deleted, each ballot cast for the deleted candidate counts for the second-choice candidate listed on the ballot. The process of eliminating the last place candidate and recounting the ballots continues until one candidate receives a majority of the vote	NO	
Ranked Order Voting: A ballot with two choices ranked the same, stops being counted at the point of two similarly ranked choices.	NO	
Ranked Order Voting: The total number of votes for two or more candidates with the least votes is less than the votes of the candidate with the next highest number of votes, the candidates with the least votes are eliminated simultaneously and their votes transferred to the next-ranked continuing candidate.	NO	
Provisional or Challenged Ballots		
Provisional/Challenged Ballots: A voted provisional ballots is identified but not included in the tabulation but can be added in the central count.	YES	
Provisional/Challenged Ballots: A voted provisional ballots is included in the tabulation, but is identified and can be subtracted in the central count	NO	
Provisional/Challenged Ballots: Provisional ballots maintain the secrecy of the ballot.	YES	
Overvotes		
Overvotes: Overvote invalidates the vote.	YES	
Overvotes – DRE / BMD: Prevented from or requires correction of overvoting.	YES	
Overvotes: If a system does not prevent overvotes, define how overvotes are counted.	YES	If allowed via voter override, overvotes are tallied separately.
Undervotes		
Undervotes: System counts undervotes cast for accounting purposes	YES	
Blank Ballots		
Totally Blank Ballots: Any blank ballot causes an alert.	YES	Precinct voters receive a warning; both precinct and central scanners will warn on blank ballots.

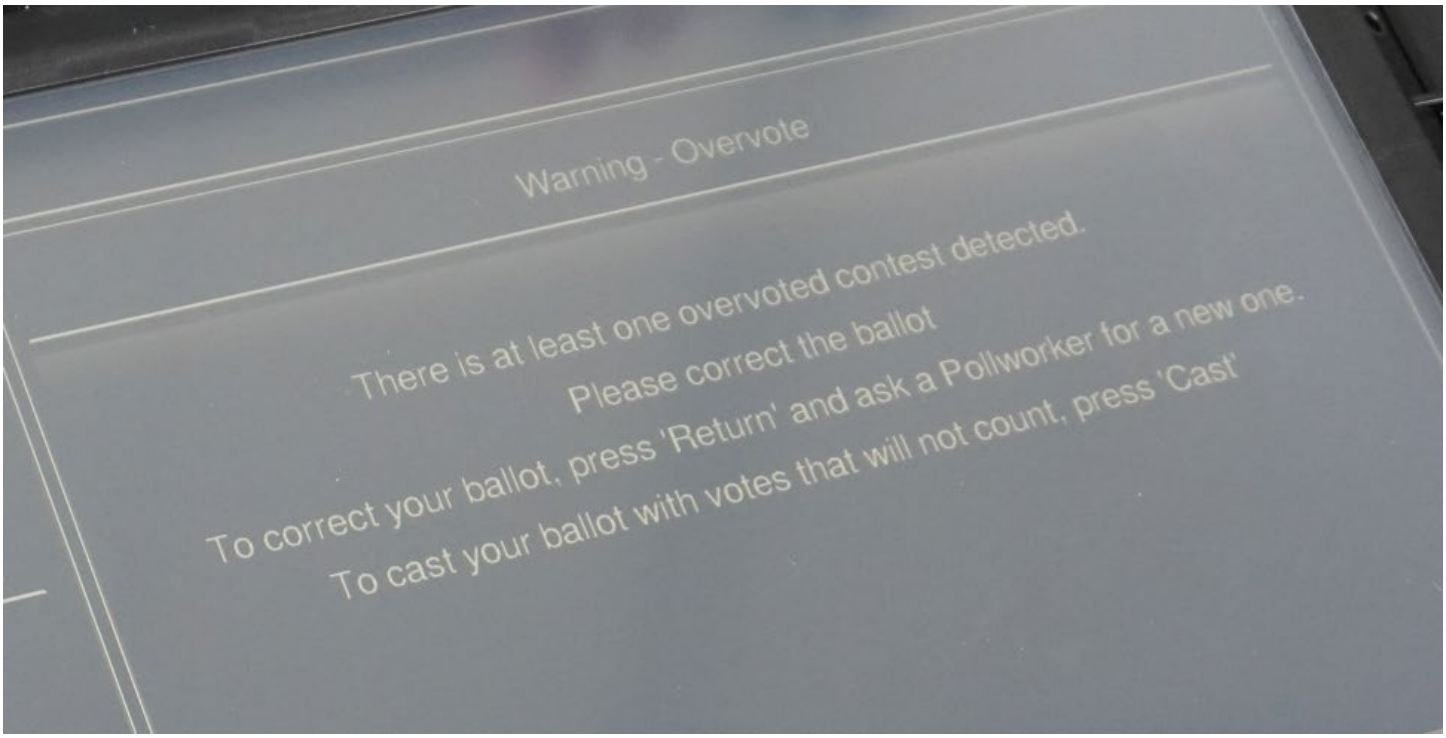
Feature/Characteristic	Yes/No	Comment
Totally Blank Ballots: If blank ballots are not immediately processed, there must be a provision to recognize and accept them	YES	Blank ballots are flagged. These ballots can be manually examined and then be scanned and accepted as blank; or precinct voter can override and accept.
Totally Blank Ballots: If operators can access a blank ballot, there must be a provision for resolution.	YES	Operators can examine a blank ballot, re-mark if needed and allowed, and then re-scan it.
Networking		
Wide Area Network – Use of Modems	NO	
Wide Area Network – Use of Wireless	NO	
Local Area Network – Use of TCP/IP	YES	Client/server only
Local Area Network – Use of Infrared	NO	
Local Area Network – Use of Wireless	NO	
Used as (if applicable):		
Precinct counting device	YES	ImageCast Precinct ImageCast Precinct 2 ImageCast Evolution
Central counting device	YES	ImageCast Central

Baseline Certification Engineering Change Orders (ECO)

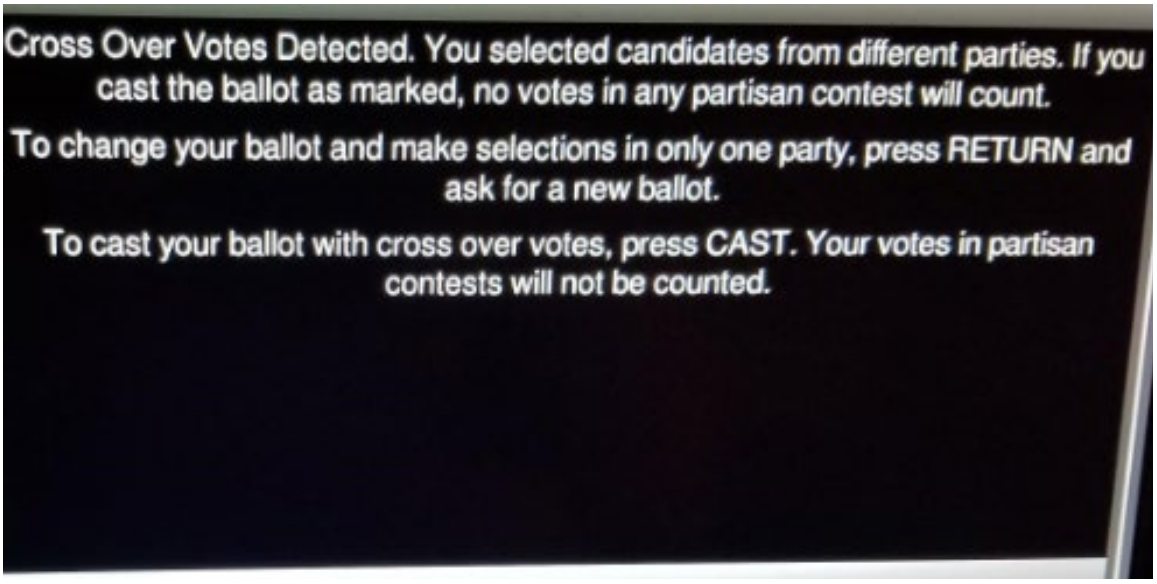
ECO #	Description
100706	Adjusted resistor value for paper sensor LED output
100718	Added Dell Precision 3440 XE EMS Express Server
100719	Added Dell Precision 3440 XE EMS-ADJ Workstation
100720	Added Dell Precision 3440 XE ICC Canon Workstation
100721	Added Dell Optiplex XE3 ICC HiPro Workstation
100741	Added Dell Latitude 3410 ICVA Workstation
100755	Added Cisco 24-port Switch (CBS350-24T-4G) Network Switch
100756	Added Cisco 8-port Switch (CBS350-8T-E-2G) Network Switch
100762	Added alternate supplier for the ICP2 LCD-Touch Panel assembly
100763	Added termination resistors to unused lines on the ICE Main Controller Board
100769	Added Dell Latitude 3410 with 512GB SSD Drive for ICVA Workstation
100772	Added Dell Latitude 3420 ICVA Workstation
100802	Added new ICP2 printer door that captures the printer platen roller onto the door
100803	Added new ICE DDR Memory Module
100812	Added alternate supplier for the ICE LCD-Touch Panel assembly
100819	Added new ICP2 Printer Controller Chip vendor
100826	ICP Provisional Flag Modification (5.5-B)
100827	ICP Provisional Flag Modification (5.5-C)
100829	Added Dell Precision 3450 XE EMS Express Server
100830	Added Dell Precision 3450 XE EMS-ADJ Client Workstation
100831	Added Dell Precision 3450 XE ICC Canon Workstation
100832	Added Lenovo 11GCPAR1US Touchscreen monitor for HiPro
100833	ICX Prime BIOS 1.40C Update
100843	Removal of ICP2 Ethernet Port
100845	Removal of ICE Ethernet Port
100849	Added New Centon 8GB SDHC Card - BiCS4
100850	Added New Centon 8GB microSD Memory Card -BiCS4
100864	Added new EMS Monitor – P2422H
100791	Added new ICE Battery Pack
100898	Removal of ICE Smartcard Reader
100891	Added Dell Precision 3460 XE EMS Express Server
100903	Added Dell Precision 3460 XE EMS-ADJ Client Workstation
100904	Added Dell Precision 3460 XE ICC Canon Workstation

Appendix D: Sample Voter Information Screens

Overvote Notification: If the ballot contains an overvote, i.e., the voter has selected more choices than they are eligible to make in a particular contest, teach tabulator will identify the overvoted contest and advise the number of choices a voter is eligible to make. The voter will have the option to either have the ballot returned or override the overvote notification. If the ballot is returned, the voter has the opportunity to spoil their first ballot and vote a new one. If the overvote warning is overridden and the voter chooses to cast the ballot as marked, they are warned that their choices in any overvoted contest will not count. This language reflects the requirements as stipulated by the WEC.



Crossover Vote Notification: if a ballot is inserted on which a voter has made choices in more than one party's primary, a warning message will appear advising the voter of such and identifying the contests with crossover votes. As with the overvote warning, the voter has the option of either having their ballot returned or casting it with the crossover votes as marked. If the voter chooses to cast their ballot as-is, any choices in contests with crossover votes will not count. This verbiage also reflects the requirements as stipulated by the WEC.



Blank Ballot: if a voter inserts a ballot on which they have made no choices, this warning will appear. The voter has the option of having the ballot returned or casting it as-is.

Appendix E: **Voting Systems Standards, Testing Protocols and Procedures Pertaining to the Use of Communication Devices in Wisconsin**

PART I: TESTING AND DOCUMENTATION REVIEW STANDARDS

Applicable VVSG Standard

The modem component of the voting system or equipment must be tested to the requirements contained in the most recent version or versions of the Voluntary Voting System Guidelines (VVSG) currently accepted for testing and certification by the U.S. Election Assistance Commission (EAC). Compliance with the applicable VVSG may be substantiated through federal certification by the EAC, through certification by another state that requires compliance with the applicable VVSG, or through testing conducted by a federally certified voting system test laboratory (VSTL) to the standards contained in the applicable VVSG. Meeting the requirements contained in the VVSG may substantiate compliance with the voting system requirements contained in Section 301 of the Help America Vote Act of 2002 (HAVA).

In the event that a system version containing telecommunications components does not receive EAC certification or is not submitted for EAC certification by the vendor, a detailed explanation shall be provided to WEC staff at the time of application listing any deficiencies that would limit the system in question from meeting the certification requirements as stated in the currently accepted VVSG testing standards in both technical and simplified language. If any of the documentation submitted to WEC is proprietary in nature, or contains protected trade secrets, the vendor shall provide an additional redacted copy of all materials. The aforementioned documentation shall be accompanied by the report from an EAC accredited VSTL listing the types of testing conducted on the system in question, the VVSG testing standard utilized, and the results of all said tests. WEC reserves the right to contact the VSTL directly to further inquire about testing of the system and ask for any clarification that may be deemed necessary as part of the documentation review prior to conducting Wisconsin state certification testing. While Wis. Stat. § 5.91 specifies that EAC certification is not required for Wisconsin state certification to be issued to a voting system, WEC staff must be provided with the most detailed information possible during the application process, including but not limited to EAC and/or VSTL report(s), technical system schematics, telecommunications specifications (including network diagrams), system security protocol, and any other documentation as required by Wis. Admin. Code EL 7.01.

Access to Election Data

Provisions shall be made for authorized access to election results after closing of the polls and prior to the publication of the official canvass of the vote. Therefore, all systems must be capable of generating an export file to communicate results from the election jurisdiction to the Central processing location on election night after all results have been accumulated. The system may be designed so that results may be transferred to an alternate database or device. Access to the alternate file shall in no way affect the control, processing, and integrity of the primary file or allow the primary file to be affected in any way.

Security

All voting system functions shall prevent unauthorized access to them and preclude the execution of authorized functions in an improper sequence. System functions shall be executable only in the intended manner and order of events and under the intended conditions. Preconditions to a system function shall be logically related to the function so as to preclude its execution if the preconditions have not been met.

Accuracy

A voting system must be capable of accurately recording and reporting votes cast. Accuracy provisions shall be evidenced by the inclusion of control logic and data processing methods, which incorporate error detection and correction methods.

Data Integrity

A voting system shall contain provisions for maintaining the integrity of voting and audit data during an election and for a period of at least 22 months thereafter. These provisions shall include protection against:

1. the interruption of electrical power
2. generated or induced electromagnetic radiation
3. ambient temperature and humidity
4. the failure of any data input or storage device
5. any attempt at an improper data entry or retrieval procedure

Reliability

Successful Completion of the Logic and Accuracy test shall be determined by two criteria

1. The number of failures in transmission
2. Accuracy of vote counting

The failure or connectivity rate will be determined by observing the number of relevant failures that occur during equipment operation. During testing, WEC staff shall maintain logs of all connection attempts. Attempts that are both successful and unsuccessful shall be noted in the logs with this information used to compile the connectivity rate. Similar logs shall be kept for calculating the rate of successful data transmissions. The accuracy is to be measured by verifying the completeness of the totals received. All test results received in the county office, whether transmitted via wired or wireless connection, shall be compared to the pre-determined results set by WEC staff to ensure that transmitted results match anticipated results.

PART II: TEST PROCEDURES AND PROTOCOLS

Overview of Telecommunication Test

The telecommunication test focuses on system hardware and software function and performance for the transmission of data that is used to operate the system and report election results. This test applies to the requirements for Volume I, Section 6 of the EAC 2005 VVSG. This testing is intended to complement the network security requirements found in Volume I, Section 7 of the EAC 2005 VVSG, which include requirements for voter and administrator access, availability of network service, data confidentiality, and data integrity. Most importantly, security services must restrict access to local election system components from public resources, and these services must also restrict access to

voting system data while it is in transit through public networks. Compliance with Section 7, EAC 2005 VVSG shall be evidenced by a VSTL report submitted with the vendor's application for approval of a voting system.

Prior to conducting any system test, WEC staff shall thoroughly review all submitted documentation including but not limited to EAC and/or VSTL report(s), technical system schematics, telecommunications specifications (including network diagrams), system security protocols, and any other documents submitted as required pursuant to Wis. Admin. Code EL 7.01.

In an effort to achieve these standards and to verify the proper functionality of the units under test, the following methods will be used to test each component of the voting system:

Wired Modem/Analog Connection Capability Test Plan

Test Objective: To transfer the results from the tabulator to the Election Management System via a wired network correctly.

Test Plan:

1. Power up tabulators and generate zero tape
2. Insert test ballots into tabulator. Once completed, close polls and generate results tape
3. Attempt to transmit results prior to the closing of the polls and printing of results tape
4. Set up a telephone line simulator that contains as many as eight phone lines
5. Perform communication suite for election night reporting using a bank with as many as seven analog modems:
    a. Connect the central site election management system to the telephone line simulator and connect the modems to the remaining telephone line ports
    b. Setup the phone line numbers in the telephone line simulator
    c. Use the simulated election to upload the election results
        i. Use at least eight tabulators in different reporting units
        ii. Use as many as two tabulators within the same reporting units
    d. Simulate the following transmission anomalies
        i. Attempt to upload results from a tabulating device to a computer which is not part of the voting system
        ii. Attempt to upload results from a non-tabulating device to the central site connected to the modem bank
        iii. Attempt to load stress by simulating a denial of service (DOS) attack or attempt to upload more than one polling location results
6. Document results on appropriate telecommunications testing data sheet
7. Following the conclusion of testing, staff must confirm the accuracy of the transmitted data by ensuring that the transmitted results match the expected results
8. Following the conclusion of testing, WEC staff shall obtain all transmission logs, ballot images, cast vote records, and results tapes for all testing locations

Wireless Capability Test Plan

Test Objective: To transfer the results from the tabulator to EMS via a wireless network correctly.

Test Plan:

1. Power up tabulators and generate zero tape
2. Insert test ballots into tabulator. Once completed, close polls and generate results tape

3. Attempt to transmit results prior to the closing of the polls and printing of results tape.
4. Perform wireless communication suite for election night reporting:
    a. Use the simulated election to upload the election results using wireless transfer to the secure FTP server (SFTP)
    b. Use at least eight tabulators in different reporting units
    c. Use as many as two tabulators within the same reporting unit
5. Simulate the following transmission anomalies
    a. Attempt to upload results from a tabulating device to a computer which is not part of the voting system
    b. Attempt to upload results from a non-tabulating device to the SFTP server
    c. Attempt to load stress by simulating a denial of service (DOS) attack or attempt to upload more than one polling location results
    d. If possible, simulate a weak signal
    e. If possible, simulate an intrusion
    f. If possible, attempt to intercept transmission signals
6. Document testing results on appropriate telecommunications testing data sheet
7. Following the conclusion of testing, staff must confirm the accuracy of the transmitted data by ensuring that the transmitted results match the expected results
8. Following the conclusion of testing, WEC staff shall obtain all transmission logs, ballot images, and cast vote records for all testing locations

Test Conclusions for Wired and Wireless Transmission

1. System must be capable of transferring 100% of the contents of results test packs without error for each successful transmission.
2. Furthermore, system must demonstrate secure rate of transmission consistent with security requirements.
3. System must demonstrate the proper functionality to ensure ease of use for clerks on election night.
4. System must provide notification of transmission failure to election inspectors
5. System must be free of any and all remote access software
6. System must be configured such that the modem component remains inoperable until after the official closing of the polls and printing of one (1) copy of the results tape**.**
7. System modems located in polling place tabulating equipment shall not be capable of receiving wireless transmissions, only of sending results packets to the central site as described above.

PART III: PROPOSED SECURITY PROCEDURES

Staff recommends that as a condition of purchase, any municipality or county which purchases this equipment and uses modem functionality must also agree to the following conditions of approval.

1. Devices which may be incorporated in or attached to components of the system for the purpose of transmitting tabulation data to another data processing system, printing system, or display device shall not be used for the preparation or printing of an official canvass of the vote unless they conform to a data interchange and interface structure and protocol which incorporates some form of error checking.
2. Any jurisdiction using a modeming solution to transfer results from the polling place to the central count location may not activate the modem functionality until after the polling place closes.

3. Both vendor and county must ensure that there is no voting system internet connectivity at the central site aside from that which is required to conduct pre-election testing and election night results transmission. At all other times, the voting system server must remain disconnected from the internet or any devices connected directly or indirectly to the internet.
4. Any municipality using modeming technology must have one set of results printed before it attempts to modem any data.
5. Any municipality purchasing and using modem technology to transfer results from the polling location to the central site are encouraged to conduct an audit of the voting equipment after the conclusion of the canvass process.
6. Default passwords provided by the vendor to county/municipality must be changed upon receipt of equipment.
7. Counties must change their passwords after every election.
   Counties must take precautions to prevent unauthorized physical access to servers.

PART IV: CONDITIONS FOR APPROVAL

Additionally, staff recommends that, as a condition/continuing condition of approval, the vendor shall:

1. Reimburse actual costs incurred by WEC in examining the system *(including travel and lodging)* pursuant to state processes.
2. Configure modem component to remain inoperative (incapable of sending transmissions) prior to the closing of the polls and the printing of tabulated results.
3. Vendor must notify WEC promptly should any security vulnerability be discovered.
4. Both vendor and county must ensure that there is no voting system internet connectivity at the central county site aside from that which is required to conduct pre-election testing and election night results transmission. At all other times, the voting system server must remain in a non-connected, air gapped state.

Part V: Conditions for continued approval

1. WEC reserves the right to schedule site visits to ensure that system was installed per certification standards to include review of:
   a. Internal and external modems
   b. Chain of custody documentation
   c. Hash validation checks
   d. Hardware and software configuration
2. WEC reserves the right to request election night transmission logs from a random selection of counties

Appendix F: Wisconsin Voting Equipment Review Panel Feedback

These comments were provided via a structured feedback form and additional comments were provided via email. Bullet points are direct quotes from participants but have been grouped by theme by WEC staff.

1. How would you rate the functionality of the equipment?

ICC Avg. rating 3.5/5

- This piece of equipment has sorting features that would be beneficial for some election officials to be able to easily identify certain features of ballots, such as write-ins. This could assist with end-of-night reconciliation.
- It can also be useful for processing absentee ballots as it can more quickly feed and read a stack of ballots.
- Central count machine seems like a good way to sort ballots in modest sized municipalities.

ICP2 Avg. rating: 4/5

- This seemed to work fine. It does not have the same issues as the ICE as it is not a dual tabulator and accessible voting equipment.

ICE Avg. rating: 2.5/5

- This machine seems to work fine as a tabulator but does not cut it as accessible equipment.
- People with disabilities should not need to vote on a tabulator.

ICX BMD w/ printer Avg. rating: 4/5

- This system is much preferred to the ICE accessible equipment. It has an updated and more user-friendly interface.
- Has too many screens/options/keys/cards [to initiate voting session] for poll workers to remember how to use them.
- Features seem secure and allows voter to know if there is an issue with their ballot.

ICX VVPAT Avg. rating: 3.5/5

- Has too many screens/options/keys/cards [to initiate voting session] for poll workers to remember how to use them.
- There is a concern that with the receipt tape and poll list with voter numbers, which are available public records, someone could request both and use them to determine how voters in a ward or community voted.
- Voters have the right to privacy and this system would not be able to guarantee that right.
- I would not recommend certifying this piece of equipment at this time.

2. How would you rate the accessible features?

ICE w/ auxiliary screen Avg. rating: 1.5/5

Process

- The interface of the accessible voting session is clunky and difficult to navigate, even for those who are used to navigating with assistive technology.
- It was a painfully cumbersome process to work through the ballot. There is a high level of repetition with each contest, which slows down the voting process significantly. It took me 15 minutes to vote my

ballot. Even as someone who is very adept at using tactile equipment and managing a screen reader, and who figured out how to skip the third re-reading of ballot selections, it took a long time. I was very fatigued after marking the ballot. I can't imagine someone who may not feel as self-assured as a person with vision loss or with dealing with technology having the patience and persistence to get through that process.

- Even with the auxiliary screen, completing a ballot requires poll worker to interrupt line of people returning their own ballots.
- Voting had to pause two times, once for the poll worker to begin the accessible voting session and another time for the poll worker to initiate printing on the ballot.
- I found using the aux screen to be a truly awful process and am deeply concerned that the very people who would benefit from accessible equipment will not use it because of how cumbersome and unusable it was.
- It was telling in the presentation by the equipment representatives that they chose to turn certain elements on and/or off to speed up the voting process in the demo. The system takes a long time to navigate and would take even an experienced voter in excess of 15 minutes to complete marking their ballot using this technology.

Privacy and Independence

- The system lacks the ability for the voter to cast their ballot privately and independently. While the transition from tabulator to sending the ballot to the auxiliary screen is short (30 seconds), it requires a poll worker to make the transition. It is obvious to others in the polling place that the voter is getting some sort of assistance as they walk to the tabulator with the poll worker and then walk over to the aux screen. After voting the ballot, the voter must call a poll worker over to the aux screen to transfer the ballot back to the tabulator, calling attention to themselves once again. The poll worker and the voter then travel back to the tabulator where the voter prints their ballot from the ADA marking system. The ballot comes out of the tabulator and then has to be reinserted to tabulate. Again, during this process, tabulation of ballots from other voters needs to halt.
- Voters with disabilities are not able to vote privately and independently.

Screen

- The size of the aux screen was very small and hard to see. When I enlarged the font to a readable size for me, I could only see a tiny portion of the ballot and had to scroll to access it all. For many people with vision loss, tracking is very difficult and is compounded by having the scroll. It's easy to lose our place and I'm concerned that this could lead to ballot marking errors and overall fatigue.

ICX BMD w/ printer Avg. rating: 4/5

Process

- If I mismarked my ballot, it was easy to correct it either right after voting the contest or when reviewing the completed ballot before printing.
- It took a little bit for me to wrap my head around inserting a plastic card to bring up the accessible voting session, but this made sense after I did it for the first time. Potentially when training voters to use the equipment, offering some language about how to insert the card, making parallels to inserting a credit card, could be helpful.

- I like the ICX BMD the most, best features for people with disabilities.
- Interestingly, I sequenced my testing with doing the [ICE with the] aux screen first and then the new touch screen. It was a night and day contrast. Where it took me at least 15 minutes to vote my ballot on the aux screen, it took me half of that time to vote on the equipment that was brought for certification.

Privacy and Independence

- If given the card when checking in, the voting process can be done privately and independently throughout, which is key!
- I loved that it printed a ballot that is equivalent to a ballot marked by a pen. This preserve ballot anonymity.
- It varies the markings on the ballot to more closely mirror how people mark their ballots. Adds an additional layer of privacy for voters using this equipment to mark their ballot.
- Consideration of placement of the screen in the voting area will be very important, since it is so large.
- The system also separates the ballot marking features and tabulation of ballots, so it does not have the same issues that the ICE equipment has.
- There was discussion from presenter that things are easier with a "helper" for someone with a disability. Voting should be made to be independent/accessible.
- I am very comfortable recommending this equipment for certification. If certified, I would highly recommend that counties using ICE equipment add this marking device as soon as possible to ensure the voter has a truly private and independent voting experience.

Screen

- As someone with a bit of functional vision, I found the screen to be accessible because of my ability to adjust font size and contrast. The screen did not seem to pick up a lot of glare. It was at a good angle for interacting.
- When I switched modes to the audio/visual, which didn't require the ballot marking device, but required using the touch screen, I found this easy to use as well. I could see voters liking this option if they aren't comfortable using a tactile device but would rather use the touch screen. They would still have the benefit of the audio as support with the visual.

Audio

- The speech was clearly understood.
- When using the audio interface, the instructions on how to use the device were very clear. I also liked that I could jump to the instructions easily if I needed to review.

Keypad

- The handheld ballot marking device [keypad] was intuitive, but also clearly marked with tactile features and braille. The bright color coding was also helpful. Because the buttons were large, they would be easy to find with less sensitivity in one's fingers. The shape of the device made for ease in holding it, especially when voting a long ballot.

ICX VVPAT Avg. rating: 2.5/5

- This system functions similarly to the ICX BMD so the accessibility features to make your selections are quite good.
- However, the system does not print a regular ballot, instead it prints a teeny tiny receipt like record of the person's votes.
- The font is so small it would be very difficult for someone to read and review their selections.
- The audio voting feature was quiet and too fast. At regular speed it takes forever.

3. Rate your overall impression of the system.

ICC Avg. rating 3.5/5

ICP2 Avg. rating: 4/5

ICE Avg. rating: 2/5

ICX BMD Avg. rating: 4/5

ICX VVPAT Avg. rating: 3/5