Analyst: James Thomas Penrose, IV
Report Title: Preliminary Assessment of Wireless Communications Technology for Michigan Voting Systems

Executive Summary

Two versions of Michigan voting systems both Dominion and ESS have been found to have utilized wireless technology. The Dominion Voting Systems proposal for Antrim County shows a quote for wireless transmission capabilities, see Figure 1. Dominion representatives also confirmed issues with wireless transmission of vote totals and even went as far as disabling the saving of ballot images without explicit authorization.

The ESS Model DS200 was found to have an internal wireless card, that has a private network address that was designed to communicate with an ES&S Primary Host Server. These devices and servers are ostensibly designed to operate on a virtual private network (VPN) that does not allow routing to the Internet. While each of the devices do have private network Internet Protocol (IP) addresses, testing revealed that the SIM card used for the DS200 could be utilized in a generic device 4G wireless device and allow for access to the same access point name (APN). There is substantial risk to the ES&S APN connected machines from malicious actors that have access to any SIM card with pre-programmed access to the APN.

The manufacturer of the wireless 4G card used in the ES&S DS200 is a company named Telit. Telit is an internet of things company that has recently taken major investment from a Chinese investment fund that has ties to the Chinese Communist Party according to UK media reporting.

Antrim County Proposal for Wireless Results Transmission

Figure 1

Dominion Voting Systems ICX

In Michigan, the Dominion Voting Systems ICX is used to allow for touchscreen voting for disabled voters. During the forensics examination of an ICX machine there were two IP addresses discovered in unallocated space on the hard drive of the Linux operating system. The existence of these IPs in unallocated space implies the ICX had previous communication with one or both of the IPs.

The first IP address was: 120.125.201.101. This IP address is registered to Ministry of Education Computer Center located in Taipei, Taiwan.

The second IP address was: 62.146.7.95. This IP address is registered to EDV-BV GmbH QSC Subkunde located in Nurenberg, Germany.

The ICX machine itself appears to be manufactured in Taiwan and shipped to the United States via airfreight using China Airlines. See the photos of the shipping box in Figure 2.

Figure 2

The ICX machine may also utilize an external wireless for communications modem with the central listener server for Dominion Democracy Suite. See the previously listed proposal from Dominion to Antrim County. The manual for the ICX also shows an Ethernet port for wired connectivity, see Figure 3.
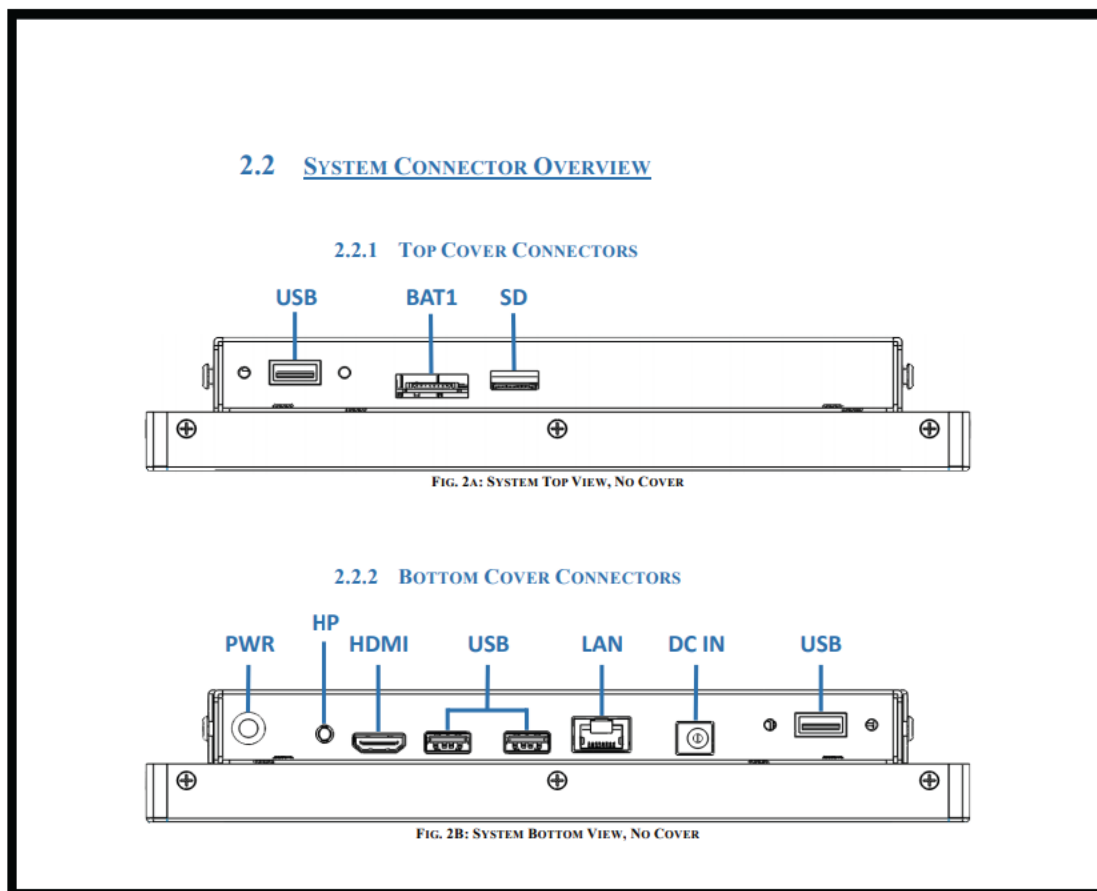
2.2 SYSTEM CONNECTOR OVERVIEW

2.2.1 TOP COVER CONNECTORS

FIG. 2A: SYSTEM TOP VIEW, NO COVER

2.2.2 BOTTOM COVER CONNECTORS

FIG. 2B: SYSTEM BOTTOM VIEW, NO COVER

Figure 3

Dominion Summary Email to Michigan Counties

Dominion sent a summary email dated August 25, 2020 (Figure 4) after the primaries describing how the process of running the election went. Notably in this summary email from Cheryl Homes of Dominion Voting Systems she describes the following issues related to the transmission of vote totals via modems. In addition, Dominion turned off image saving without any authorization from the Secretary of State noted in the communication.

> *"Modem transmission this election were (sic) terrible in some areas! Failures and timing out due to the weaker 3G signal and cellular network issues meant that some of your precincts weren't able to transmit but instead brought the cards in to tally. We turned off image saving which will improve the transmission by a few seconds. We are testing the maximum time out setting for receipt of the transmission on the servers to*

see if that will improve the success rate. We will also be doing some testing In the county to see if there are any ways to improve the process."

From: Cheryl Holmes <cheryl.holmes@dominionvoting.com>
Sent: Tuesday, August 25, 2020 9:23 AM

Bailey v Antrim County
No. 20-9238-CZ

MDOS_0000980

Cc: Tim Baumbach <tim.baumbach@dominionvoting.com>; David Stahl <david.stahl@dominionvoting.com>; Cheryl Holmes <cheryl.holmes@dominionvoting.com>
Subject: Michigan Post Election Follow up & Pre-Election Prep

Hello Everyone,

Congratulations on the success of your election and surviving the Primaries! I hope that you are well, safe and catching up on all the things that got set aside in the rush of absentee applications, mailings, inspector recruiting, training and election readiness.

This election we saw a higher than usual report of ballots jamming at the tabulator. This was partially due to the very long ballot, greater number of folds in the ballots at the AVCB. The rain on election day made it worse as the humidity made the ballot tear more easily. Dominion is actively working with our engineers to determine the cause of the jamming and a resolution to improve performance. To reduce the ballot exposure to moisture, we recommend that you keep your ballots in the protective shrink-wrap until needed and only remove the pads or stacks that you need.

Modem transmission this election were terrible in some areas! Failures and timing out due to the weaker 3G signal and cellular network issues meant that some of your precincts weren't able to transmit but instead brought the cards in to tally. We turned off image saving which will improve the transmission by a few seconds. We are testing the maximum time out setting for receipt of the transmission on the servers to see if that will improve the success rate. We will also be doing some testing In the county to see if there are any ways to improve the process.

Figure 4

ESS DS200 Machine

The DS200 machine was found to have a wireless 4G modem installed internally within the enclosure of the machine. The printed tapes that summarize the activity during the election show that the 4G modem was used to send the results to a central listener server via secure file transfer. The Telit LE910-SV1 in Figure 5 was found within the ES&S enclosure.

Figure 5

The printed summary tape from the ES&S machines also indicate that the submission of the vote totals occurred using the wireless 4G modem, see Figure 6.

Figure 6

The Telit LE910-SV1 card installed in the ES&S device was utilizing a commercial Verizon SIM card with an APN configuration specific to the ES&S DS200 provisioning. Testing revealed that the same SIM card could be utilized in a separate wireless hotspot device and the device could then join the same APN as the ES&S voting machines. An unauthorized user could gain access to this APN by an extra SIM card pre-provisioned for this APN, or by removing a SIM from an operational device and using it in another device.

Telit LE910-SV1 Hardware Summary
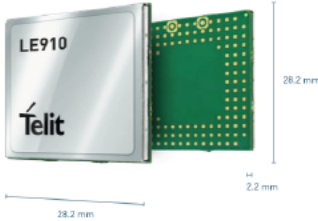
According to the hardware summary specifications datasheet from Telit, the LE910-SV1 comes standard with "Internet friendly integrated TCP/IP and UDP/IP stacks, as well as HTTP, SMTP,

FTP, SSL." (Figure 7) These features are very useful to application programmers, but are also ripe for abuse by unauthorized users of the APN devoted to the ES&S machines.
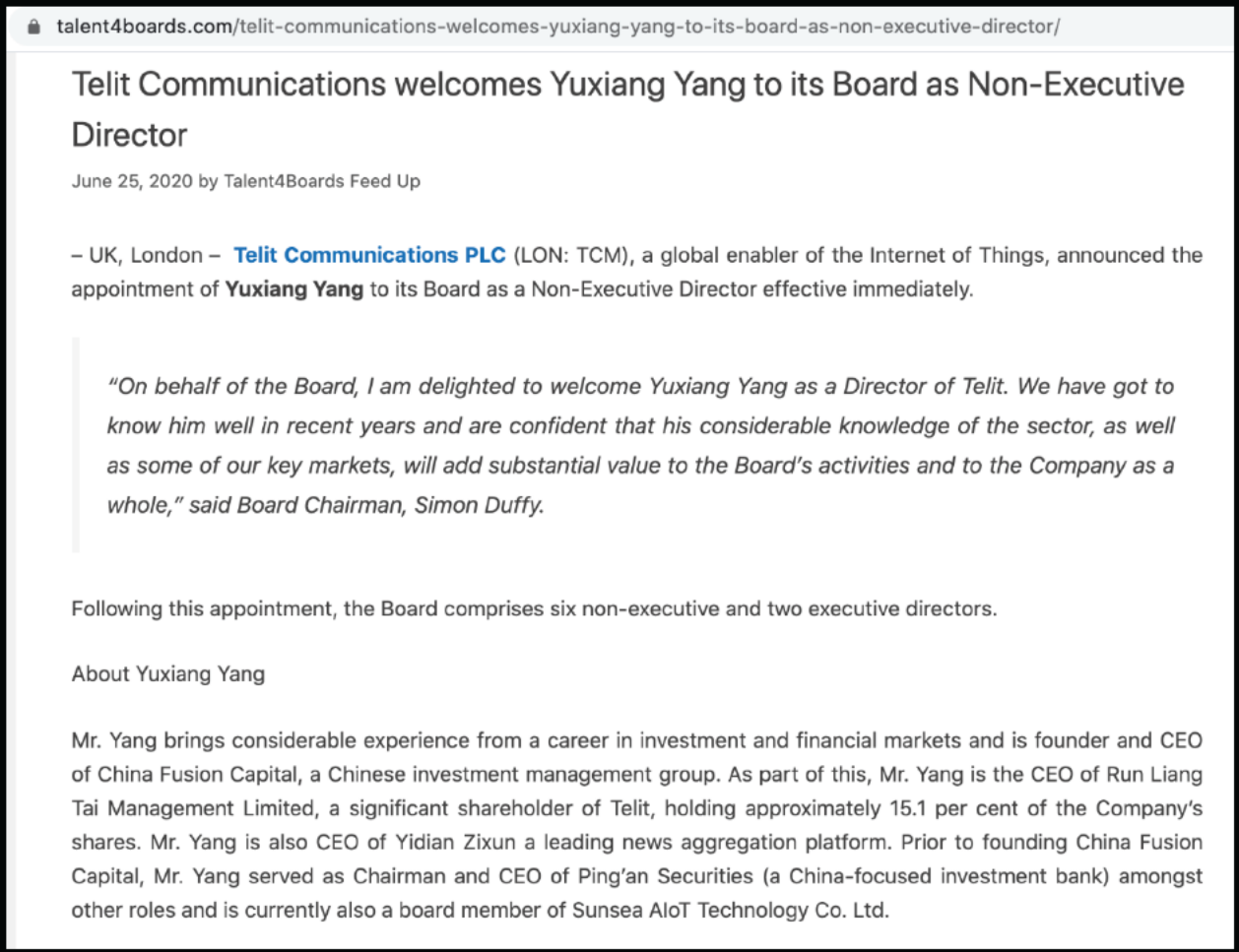

Figure 7

Background on Telit

Telit is a publicly traded company Internet of Things (IoT) and Machine to Machine (M2M) company headquartered in London, UK with an operations unit in Trieste, Italy.
In late 2017, Run Liang Tai Management in Hong Kong built a 14 percent stake in Telit. Mr. Yuxiang Yang sits on the board of directors for Telit (see Figure 8) and is CEO of Run Liang Tai Management Limited.

Figure 8

A media report from August 15, 2020 from the UK online publication *Financial Mail on Sunday* indicated that there were concerns raised about Chinese influence of the Telit firm within the UK government. Here is an excerpt from the news story located here: https://www.thisismoney.co.uk/money/markets/article-8630685/Chinese-close-UK-internet-things-pioneer.html

> ***...The maneuvering by powerful investors comes after secretive Chinese multi-millionaire banker Yuxiang Yang joined Telit's board earlier this summer.***

His appointment may raise concern in Westminster that a Chinese businessman with ties to his country's Communist government could be seeking to gain influence over the business.

Yang runs China Fusion Capital, the parent company of Run Liang Tai Management, a mysterious investment fund that has built a 15 per cent stake in Telit to become its largest shareholder.

Sources said some of the firms that have invested in Run Liang are giant Chinese companies, such as coal mining group Wintime Energy and Jiangsu Shuangliang, a manufacturer of air conditioners and boilers.

Run Liang also owns a stake in Sunsea Telecommunications, a Shenzhen-listed 'internet of things' provider that recently raised around $200million (£1.5million) by issuing shares to Zhjzgroup, a state-backed tourism firm. Yang also sits on the board of Sunsea. Speculation has been mounting that Run Liang is hoping to engineer a merger of some or all of Telit with China-based Sunsea.

Run Liang's move on Telit, which is listed on AIM, follows a period in which several other London-listed businesses have been bought by China-linked firms.

Imagination Technologies was bought by Canyon Bridge – a private equity fund bankrolled by Beijing – in 2017 for £550million. Concerns rose in the spring when Canyon Bridge tried to place four directors from China Reform Holdings on to Imagination's board.

Conservative MPs Tom Tugendhat, who now leads the China Research Group, and David Davis warned that Imagination's intellectual property could be shifted to China.

When asked about Telit, Bob Seely, chairman of the Foreign Affairs Select Committee, said: 'We do need a thorough review of investment security and we need an oversight board for purchases by high-risk vendors or from higher risk states.' Telit, which is due to unveil figures next week, declined to comment.