



**Homeland  
Security**

Science and Technology

**U.S. Department of Homeland Security**



**System Assessment and Validation for Emergency Responders**

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions. Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations on commercial equipment and systems, and develops knowledge products that provide relevant equipment information to the emergency responder community.

SAVER Program knowledge products provide information on equipment that falls under the categories listed in the DHS Authorized Equipment List (AEL), focusing primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?" These knowledge products are shared nationally with the emergency responder community, providing a life- and cost-saving asset to DHS, as well as to Federal, state, and local responders.

The SAVER Program is supported by a network of Technical Agents who perform assessment and validation activities and produce SAVER knowledge products.

For more information on the program or the assessed technologies, contact the SAVER Program by e-mail or visit the SAVER website.

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# Summary

## Ruggedized Tablets

(AEL reference number 04HW-01-HHCD)

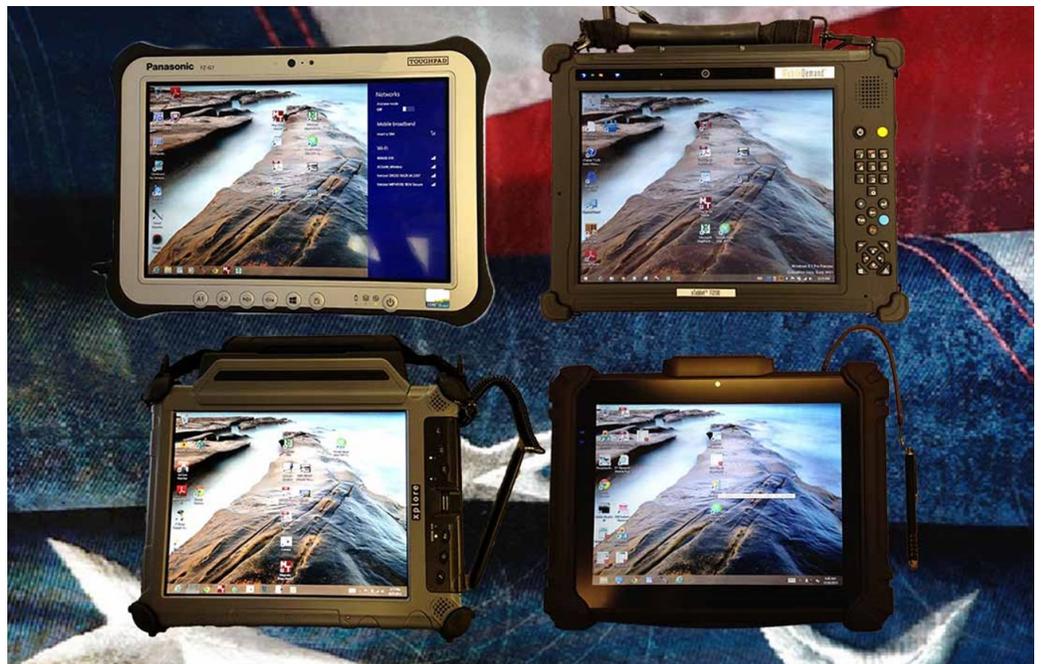
Ruggedized tablets are mobile computing devices that are able to withstand various environmental and hazardous conditions and rough handling, making them suitable for use by law enforcement personnel in the field. Ruggedized tablets are used by law enforcement personnel to write reports, communicate with peers, take notes during interrogations, conduct surveillance operations, and search criminal records databases.

In order to provide responders with information on currently available ruggedized tablets running the Microsoft® Windows® 8 operating system, the Space and Naval Warfare Systems Center (SPAWARSYSCEN) Atlantic conducted a comparative assessment for the System Assessment and Validation for Emergency Responders (SAVER) Program in August 2013. Detailed findings are provided in the *Ruggedized Tablets Assessment Report*, which is available at <http://www.firstresponder.gov/SAVER>.

## Assessment Methodology

Prior to the assessment, eight law enforcement personnel were chosen from various jurisdictions to participate in a focus group. The group identified evaluation criteria and recommended product selection criteria and possible scenarios for assessment.

After identifying evaluation criteria, the focus group assigned each criterion to one of four SAVER categories; no criteria were identified for the Affordability category. The focus group then assigned a weight for each criterion's level of



importance. Once the criteria were weighted, the four SAVER categories were assigned a percentage value to represent the level of each category's importance relative to the other categories.

Of the 22 evaluation criteria identified by the focus group, 19 were assessed. Three criteria—docking, power options, and technical support—were not assessed. These three criteria were the only criteria identified for the Deployability and Maintainability categories; since they were omitted from the assessment, the category weights of 10 percent each were evenly distributed to the weights of the remaining two categories.

Based on focus group recommendations and market research, the following ruggedized tablets were selected for assessment:

- Panasonic Corporation of North America, Toughpad® FZ-G1 Tablet PC;
- Xplore Technologies Inc., iX104C5 DMSR LTE Tablet;
- MobileDemand, xTablet® T1200; and
- DT Research Inc., DT315CT.

Five law enforcement personnel from various jurisdictions and with experience using ruggedized tablets were selected to be evaluators for the assessment. The evaluators' experience with ruggedized tablets, combined with their experience in law enforcement, provided meaningful results for this assessment.

During the assessment, evaluators rated the ruggedized tablets based on evaluation criteria established by the focus group. The assessment was separated into two phases: the specification assessment and the operational assessment. Evaluators assessed the systems based on vendor-provided information during the specification assessment. Hands-on experience during three scenarios—setup, crash investigation, and playback—served as the basis for the operational assessment.

## Assessment Results

Table 1 displays the composite assessment scores as well as the category scores for each ruggedized tablet. Scores are based on a 5-point scale; higher scores indicate a more favorable rating by evaluators. The advantages and disadvantages of each ruggedized tablet, as identified by evaluators, are listed in table 2. To view how each ruggedized tablet scored against the evaluation criteria assigned to the SAVER categories, see table 3. For specifications, see table 4.

According to evaluators, ruggedized tablets are primarily used by law enforcement personnel in field operations where the user might encounter a variety of environmental and hazardous conditions. Features such as durability, connectivity, and available ports are all factors to consider when purchasing a ruggedized tablet. Evaluators agreed that all the assessed tablets effectively scanned driver's licenses and barcodes and featured adequate screen sizes. They also noted that front-facing microphones make for poor audio quality during interviews and that all of the tablets had difficulty automatically adjusting for varying lighting conditions.

Responder agencies that may be considering the purchase of ruggedized tablets should review the detailed findings in the *Ruggedized Tablets Assessment Report* and carefully consider each ruggedized tablet's overall capabilities and limitations in relation to their jurisdiction's operational needs. All reports in this series, as well as reports on other technologies, are available in the SAVER section of the FirstResponder.gov website, <http://www.firstresponder.gov/SAVER>.

### SAVER Category Definitions

**Affordability** groups criteria related to life-cycle costs of a piece of equipment or system.

**Capability** groups criteria related to the power, capacity, or features available for a piece of equipment or system to perform or assist the responder in performing one or more relevant tasks.

**Deployability** groups criteria related to the movement, installation, or implementation of a piece of equipment or system by responders at the site of its intended use.

**Maintainability** groups criteria related to the maintenance and restoration of a piece of equipment or system to operational condition by responders.

**Usability** groups criteria related to the quality of the responders' experience with the operational employment of a piece of equipment or system. This includes the relative ease of use, efficiency, and overall satisfaction of the responders with the equipment or system.

**Table 1. Ruggedized Tablet Assessment Results**

System	Composite Score	Capability (50% Weighting)	Usability (50% Weighting)
Toughpad® FZ-G1 Tablet PC	3.4	3.3	3.5
iX104C5 DMSR LTE Tablet	3.2	3.4	3.1
xTablet® T1200	3.2	3.3	3.0
DT315CT	2.7	2.4	3.0

**Table 2. Ruggedized Tablet Advantages and Disadvantages**

System	Advantages	Disadvantages
 <p><b>Toughpad® FZ-G1 Tablet PC</b> Composite Score: 3.4</p>	<ul style="list-style-type: none"> <li>• Weight and size</li> <li>• Clear, sharp display in most lighting conditions</li> <li>• Automatic brightness adjustment</li> <li>• Variety of available options</li> <li>• Dust covers for ports</li> <li>• Responsive touch screen</li> <li>• Data storage capacity</li> <li>• Good quality images</li> <li>• Fingerprint resistant</li> </ul>	<ul style="list-style-type: none"> <li>• No hand strap</li> <li>• No integrated magnetic stripe reader option</li> <li>• Video appears jumpy if tablet is moved while recording</li> <li>• Poor audio captured by tablet</li> </ul>
 <p><b>iX104C5 DMSR LTE Tablet</b> Composite Score: 3.2</p>	<ul style="list-style-type: none"> <li>• Keypad with buttons</li> <li>• Dust covers for ports</li> <li>• Extremely rugged</li> <li>• Many available ports</li> <li>• Data storage capacity</li> <li>• Operating temperature range</li> <li>• Integrated biometrics/fingerprint reader</li> </ul>	<ul style="list-style-type: none"> <li>• Camera location</li> <li>• Weight and size</li> <li>• Secure Digital port not easily accessible</li> <li>• Less responsive to finger touch than stylus</li> </ul>
 <p><b>xTablet® T1200</b> Composite Score: 3.2</p>	<ul style="list-style-type: none"> <li>• Operating temperature range</li> <li>• Maximum amount of Random Access Memory</li> <li>• Hand strap</li> </ul>	<ul style="list-style-type: none"> <li>• No integrated mobile broadband capability</li> <li>• Weight and size</li> <li>• Handle can obscure camera</li> <li>• Buttons on keypad are small and too close together</li> <li>• Wi-Fi module location</li> </ul>
 <p><b>DT315CT</b> Composite Score: 2.7</p>	<ul style="list-style-type: none"> <li>• Integrated magnetic stripe reader</li> <li>• Hand strap</li> <li>• Weight and size</li> <li>• Location of integrated barcode reader</li> </ul>	<ul style="list-style-type: none"> <li>• No camera</li> <li>• No microphone</li> <li>• Slow processor</li> <li>• Operating temperature range</li> <li>• Large tip on stylus</li> <li>• Lack of dust covers for ports</li> <li>• Amount of Random Access Memory</li> <li>• Touch screen responsiveness</li> <li>• Short battery runtime</li> </ul>

**Table 3. Ruggedized Tablet Criteria Ratings<sup>1</sup>**

KEY						
Lowest Rating		Highest Rating				
			Toughpad® FZ-G1 Tablet PC	iX104C5 DMSR LTE Tablet	xTablet® T1200	DT315CT
<b>Capability</b>						
Connectivity						
Ports						
Memory						
Battery runtime						
Storage capacity						
Camera						
Microphone						
Location tracking						
Accessories and options						
<b>Deployability</b>						
Docking		Not assessed	Not assessed	Not assessed	Not assessed	
<b>Maintainability</b>						
Power options		Not assessed	Not assessed	Not assessed	Not assessed	
Technical support		Not assessed	Not assessed	Not assessed	Not assessed	
<b>Usability</b>						
Durability						
Processing performance						
Display						
Touch screen						
Barcode reader						
Magnetic stripe reader						
Ergonomics						
Video playback						
Audio playback						
Operating temperature range						

Note:

<sup>1</sup> Averaged criteria ratings for each assessed product are graphically represented by colored and shaded circles. Highest ratings are represented by full green circles.

**Table 4. Ruggedized Tablet Specifications<sup>1</sup>**

Specifications	Toughpad® FZ-G1 Tablet PC	iX104C5 DMSR LTE Tablet	xTablet® T1200	DT315CT
MSRP	\$3,098	\$6,600	\$3,634	\$2,610
Warranty duration	3 years	3 years	1 year	1 year
Dimensions	10.6 x 7.4 x 0.8 inches	11.2 x 8.3 x 1.6 inches	11.2 x 8.7 x 1.7 inches	10.2 x 8.3 x 0.8 inches
Weight	2.5 pounds	5.4 pounds	4.8 pounds	2.7 pounds
Screen size	10.1 inches	10.4 inches	10.4 inches	9.7 inches
Type and number of ports	<ul style="list-style-type: none"> <li>• One USB 3.0 port</li> <li>• One audio-out jack</li> <li>• One HDMI (Type A) port</li> </ul>	<ul style="list-style-type: none"> <li>• One Ethernet port</li> <li>• Two USB 2.0 ports</li> <li>• One audio-out jack</li> <li>• One microphone port</li> <li>• One microSD and SIM port</li> <li>• One VGA port</li> <li>• Two pin and pad expansion ports</li> </ul>	<ul style="list-style-type: none"> <li>• One Ethernet port</li> <li>• Two USB 3.0 ports</li> <li>• One mini USB port</li> <li>• One audio-out jack</li> <li>• One SD card slot</li> <li>• One Smartcard® reader</li> </ul>	<ul style="list-style-type: none"> <li>• One USB 2.0 port</li> <li>• One audio-out jack</li> <li>• One microphone port</li> <li>• One SD port</li> <li>• One half-slot Smartcard reader</li> </ul>
Processor	Intel® Core™ i5 vPro™ 1.9 gigahertz (up to 2.9 gigahertz with Turbo Boost)	Intel Core i7 620UE 1.06 gigahertz (up to 2.13 gigahertz with Turbo Boost)	Intel Core i5-3427U 1.8 gigahertz (up to 2.8 gigahertz with Turbo Boost)	Intel Atom™ Dual Core 1.86 gigahertz
Data storage capacity	128 gigabytes	160 gigabytes	64 gigabytes	64 gigabytes
Maximum onboard data storage capacity	256 gigabytes	320 gigabytes	128 gigabytes	256 gigabytes
Type and amount of RAM	Type not provided 4 gigabytes	DDR3 SDRAM 8 gigabytes	DDR3 SDRAM 8 gigabytes	Type not provided 4 gigabytes
Maximum amount of RAM	8 gigabytes	8 gigabytes	16 gigabytes	4 gigabytes
Security features	<ul style="list-style-type: none"> <li>• Password security</li> <li>• Kensington™ cable lock slot</li> <li>• Computrace® theft protection agent</li> </ul>	<ul style="list-style-type: none"> <li>• Biometrics/Fingerprint reader</li> <li>• Trusted Platform Module</li> <li>• Kensington cable lock slot</li> <li>• Intel Anti-Theft</li> <li>• Computrace theft protection agent</li> </ul>	<ul style="list-style-type: none"> <li>• Microsoft BitLocker</li> <li>• Windows Defender® anti-virus application</li> <li>• Virtual Private Network</li> </ul>	<ul style="list-style-type: none"> <li>• Trusted Platform Module</li> <li>• Encryption</li> </ul>
Cellular carriers	Sprint and Verizon	AT&T	No internal connectivity options; connects to carriers with USB modems that fit into expansion module	AT&T
Mobile broadband <sup>2</sup>	3G	4G LTE	Dictated by USB modem	3G
Accessories and options	<ul style="list-style-type: none"> <li>• Long-life battery pack</li> <li>• Rotating hand strap</li> <li>• Various ToughMate® G1 cases</li> <li>• Tether</li> <li>• Screen protector</li> </ul>	<ul style="list-style-type: none"> <li>• Desktop docking station</li> <li>• Various hand straps</li> <li>• Various carrying cases</li> <li>• Screen protector</li> </ul>	<ul style="list-style-type: none"> <li>• Desktop docking station</li> <li>• External battery charger</li> <li>• 2-point shoulder strap</li> <li>• Ruggedized keyboards</li> </ul>	<ul style="list-style-type: none"> <li>• Desktop docking station</li> <li>• Protective rubber grips set</li> <li>• Carrying case with compact USB keyboard</li> <li>• Mini USB keyboard</li> <li>• Shoulder strap</li> </ul>

**Table 4. Ruggedized Tablet Specifications<sup>1</sup> Continued**

Specifications	Toughpad® FZ-G1 Tablet PC	iX104C5 DMSR LTE Tablet	xTablet® T1200	DT315CT
Continuous-use battery runtime	8.0 hours	6.5 hours	11.5 hours	4.0 hours
Battery charge time	2.5 hours	Information not provided	Information not provided	Information not provided
Operating temperature	14°F to 122°F	-30°F to 140°F	-4°F to 140°F	41°F to 95°F
Storage temperature	Information not provided	-60°F to 160°F	-22°F to 160°F	-4°F to 140°F
Ingress protection rating	IP65	IP67	IP65	IP54
Impact resistance	Drop tested to 4 feet	26 drops each while the system was operating: 4 feet to concrete; 7 feet to plywood over concrete	26 drops to plywood over concrete from 5 feet	Drop tested to 3 feet
Decontamination	Information not provided	Can be cleaned with any lens cleaner, including isopropyl alcohol	Information not provided	Wipe clean with dry screen cleaning cloth
Scratch-resistant screen	Information not provided	Yes	Yes	Yes

Notes:

<sup>1</sup> Information was provided by manufacturers and has not been independently verified by the SAVER Program.

<sup>2</sup> Mobile broadband options change often. Information on the latest mobile broadband options is available on vendor websites.

DDR3 = double data rate type three

F = Fahrenheit

G = generation

HDMI = high-definition multimedia interface

IP = ingress protection rating

LTE = long-term evolution

MSRP = manufacturer's suggested retail price

RAM = random access memory

SD = secure digital

SDRAM = synchronous dynamic random access memory

SIM = subscriber identity module

USB = universal serial bus

VGA = video graphics array