Element Materials Technology Denver-Longmont A.K.A. NTS Labs, LLC Test Report for Electromagnetic Interference (EMI) Testing of the Smartmatic PCOS

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Revision History

Rev.	Description	Issue Date
0	Initial Release	05/22/2025

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1.0 Introduction

This document presents the test procedures used and the results obtained during the performance of an Electromagnetic Interference (EMI) test program at Element Materials Technology Denver-Longmont (hereafter referred to as "Element"). The test program was conducted to assess the ability of the specified Equipment Under Test (EUT) to successfully satisfy the requirements defined in the test specification.

2.0 References

The following references listed below form a part of this document to the extent specified herein.

- Test Specification: See Table 5.0-1
- Pro V&V, Inc Purchase Order 2025-002,2025-008, dated 02/18/2025,04/01/2025
- Element Quotation OP0670061, dated 02/17/2025
- ISO/IEC 17025:2017(E) *General Requirements for the Competence of Testing and Calibration Laboratories,* dated 11/2017

3.0 Product Selection and Description

Pro V&V, Inc selected and provided the following test sample(s) to be used as the Equipment Under Test.

Table 3.0-1: Product Identification – Equipment Under Test (EUT)

Item	Qty.	Name/Description	Part Number	Serial Number
1	1	Smartmatic PCOS	813	GESA481A01000163

3.1 Security Classification

Non-classified

4.0 General Test Requirements

4.1 Test Equipment

The instrumentation used in the performance of these tests is periodically calibrated and standardized within manufacturer's rated accuracies and are traceable to the National Institute of Standards and Technology. The calibration procedures and practices are in accordance with ISO 17025:2017. Certification of calibration is on file subject to inspection by authorized personnel.

4.2 Measurement Uncertainties

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below were calculated using the approach described in CISPR 16-4-2:2003 using a coverage factor of k=2, which gives a level of confidence of approximately 95%. The levels were found to be below levels of CISPR and therefore no adjustment of the data for measurement uncertainty is required.

Table 4.2-1: Measurement Uncertainties (Immunity)

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
Radiated Immunity	V/m	80MHz - 10GHz	.-26.3% to 29.97%
ESD	KV	NA	.+/- 8.6%
Fast Transients	Voltage	NA	.+/- 5.98%
	Time	NA	.+/- 8.6%
Surge	Voltage	NA	.+/- 4.9%
Conducted Immunity (CDN)	Voltage	NA	.-12.6% to 13.3%
Conducted Immunity (BCI)	Voltage	NA	.-13.5% to 15.3%
Voltage Dips / Interrupts	Voltage	NA	.+/- 2.3%
	Time	NA	.+/- 0.08 ms
Magnetic Immunity	Amps	NA	.+/- 0.8%
Pulsed Magnetic Immunity	Amps	NA	.+/- 9.9%

5.0 Test Description and Results

Table 5.0-1: Summary of Test Information & Results

Section	Test	Specification	Test Facility	Test Date	Part #	Serial #	Test Result
5.1	Radiated RF Immunity	IEC 61000-4-3	Longmont	03/24/2025 - 03/25/2025	813	GESA481A01000163	Failed
5.2	Radiated RF Immunity	VVSG 2.0	Longmont	05/19/2025	813	GESA481A01000163	Passed

The decision rule for Test Results was based on the Test Specification used for testing.

5.1 Radiated RF Immunity

5.1.1 Test Procedure

The EUT was tested in accordance with IEC 61000-4-3.

5.1.2 Test Result

The EUT failed the defined requirements.

5.1.3 Test Datasheets

Element Materials Technology

Radiated RF Immunity per: IEC 61000-4-3

Standard Referenced:	IEC 61000-4-3			Date:	3/24/2025
Temperature:	26°C	Humidity:	13%	Pressure:	833 mb
Input Voltage:	120Vac/60Hz				
Configuration of Unit:	Scanning Ballots				
Test Engineer:	Mike Tidquist				

Date	Time	Log Entries	Initials	Result
3/24/25	1130-1200	10V/m Pretest verification complete	MT	Complete
	1200-1530	Radiated RF Immunity 10V/m, 80 – 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120 VAC / 60 Hz (4.1.2.10) Finished Front, Right, Bsck sides both polarities.	MT	Continue
3/25/25	0800-1100	Continue: Radiated RF Immunity 10V/m, 80 – 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120 VAC / 60 Hz (4.1.2.10) Left side horizontal polarity somewhere between 80MHz and 142MHz touch screen quits operating, trying to determine what frequency. Error repeated multiple times, Client is calling RFI a fail	MT	Fail

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Radiated RF Immunity per: IEC 61000-4-3

Standard Referenced: IEC 61000-4-3 Date: 3/24/2025

Temperature: 26°C Humidity: 13% Pressure: 833 mb

Input Voltage: 120Vac/60Hz

Configuration of Unit: Scanning Ballots

Test Engineer: Mike Tidquist

Frequency	Modulation				Step Size	Field	Polarity	Dwell	Comments	Criteria Met	Pass / Fail
(MHz)	Type	%	Freq	Form	(%)	(V/m)	(V or H)	(sec)			
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Front**	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Right**	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Back**	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	**Left**	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		C	Fail

5.1.4 Test Photographs

Radiated RF Immunity Front

Radiated RF Immunity Right

Radiated RF Immunity Back

Radiated RF Immunity Left

5.1.5 Test Equipment List

Table 5.1-1: Radiated RF Immunity Test Equipment List

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC059916	Chamber (EMI, Semi-Anechoic)	National Technical Systems	GP0	NCR	NCR
WC059439	Meter (Digital Multimeter)	Fluke	85	08/16/2024	08/16/2025
WC059457	Coupler (Bi-Directional)	Werlatone	C3908-10	08/21/2020	NCR
WC059710	Amplifier (Pre/RF/Low Noise)	Ophir RF	5127F	09/17/2012	NCR
WC059797	Generator (Signal)	Wiltron	68369B	07/25/2024	07/31/2025
WC059805	Antenna (Log Periodic)	ETS-Lindgren	3142B	NCR	NCR
WC070467	Meter (Power)	Agilent Technologies	E4418B	07/30/2024	07/30/2025
WC070506	Sensor (Power)	Hewlett Packard	E4421A	07/30/2024	07/31/2025
WC076935	Cable (Test)	Teledyne-taber	RF Coax Cable	01/01/1900	NCR
WC078459	Cable (Test)	National Technical Systems	TrueBlue	NCR	NCR
WC078470	Software	ETS-Lindgren	C47213	01/01/1900	NCR
WC078486	Meter (Hydrometer)	Extech Instruments	Datalogger 42270	08/12/2024	08/31/2025
WC084405	Cable (Test)	Fairview Microwave	GP0 RF N-Type	01/01/1900	NCR

Calibration Abbreviations
CAL: Calibration
NCR: No Calibration Required

5.2 Radiated RF Immunity

5.2.1 Test Procedure

The EUT was tested in accordance with VVSG 2.0.

5.2.2 Test Result

The EUT passed the defined requirements.

5.2.3 Test Datasheets

Element Materials Technology

Radiated RF Immunity per IEC 61000-4-3

Standard Referenced: IEC61000-4-3 Date: 5/19/2025

Temperature: 29°C Humidity: 25% Pressure: 823 mb

Input Voltage: 120Vac/60Hz

Configuration of Unit: ShoeShine Mode

Test Engineer: T. Wittig

Date	Time	Log Entries	Initials	Result
5/19/2025	0745	Setup and performed 4-3 pre-test verification at 10V/m	TW	---
	0821	Client arrived and started setup the Smartmatic PCOS in GP0	TW	---
	0841	Begin Radiated RF Immunity 10V/m, 80 - 1000 MHz, 1% Step, 80% AM, 1kHz sine, 3s dwell 120Vac/60Hz (4.1.2.10)	TW	---
		Start on left side, Vertical polarity	TW	---
		H-Pole: At ~ 360 MHz, EUt stooped shoeshing	TW	---
		Backed up to 220 MHz, could not repeat issue	TW	---
		Backed over frequency ranges 3x, no other issues occurred	TW	---
	1017	Continue 4-3 testing on H-Pole and other sides	TW	---
	1452	Completed four side, V-H poles from 80 MHz to 1 GHz	TW	Pass

Element Materials Technology

Radiated RF Immunity per IEC 61000-4-3

Standard Referenced: IEC61000-4-3 Date: 5/19/2025

Temperature: 29°C Humidity: 25.00% Pressure: 823 mb

Input Voltage: 120Vac/60Hz

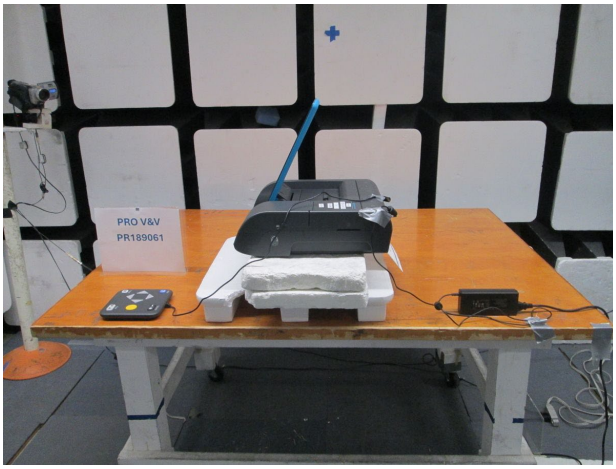
Configuration of Unit: ShoeShine Mode

Test Engineer: T. Wittig

Frequency	Modulation				Step Size	Field	Polarity	Dwell	Comments	Criteria Met	Pass / Fail
(MHz)	Type	%	Freq	Form	(%)	(V/m)	(V or H)	(sec)			
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	Front	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	Right	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	Back	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	V	3	Left	A	Pass
80 - 1000	AM	80	1kHz	Sine	1	10	H	3		A	Pass

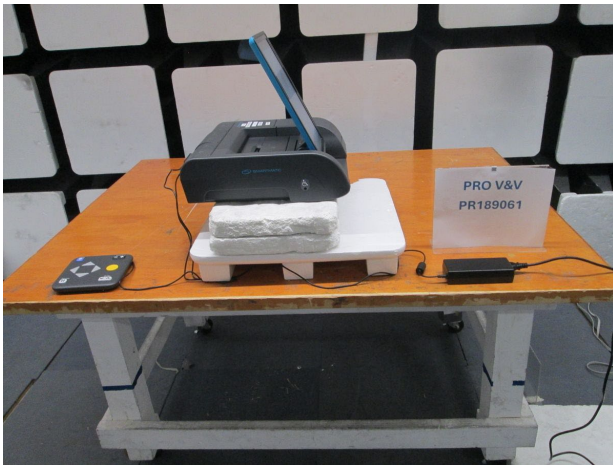
5.2.4 Test Photographs

4-3 Test Setup - Front 001



4-3 Test Setup - Right

4-3 Test Setup - Back



4-3 Test Setup - Left

5.2.5 Test Equipment List

Table 5.2-1: Radiated RF Immunity Test Equipment List

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC059457	Coupler (Bi-Directional)	Werlatone	C3908-10	08/21/2020	NCR
WC059669	Meter (Digital Multimeter)	Fluke	83-3	11/22/2024	11/22/2025
WC059710	Amplifier (Pre/RF/Low Noise)	Ophir RF	5127F	09/17/2012	NCR
WC059805	Antenna (Log Periodic)	ETS-Lindgren	3142B	NCR	NCR
WC059852	Generator (Signal)	Anritsu Wiltron	69367B	03/05/2025	03/21/2026
WC070467	Meter (Power)	Agilent Technologies	E4418B	07/30/2024	07/30/2025
WC070506	Sensor (Power)	Hewlett Packard	E4421A	07/30/2024	07/31/2025
WC076935	Cable (Test)	Teledyne-taber	RF Coax Cable	01/01/1900	NCR
WC078459	Cable (Test)	National Technical Systems	TrueBlue	NCR	NCR
WC078470	Software	ETS-Lindgren	C47213	01/01/1900	NCR
WC078486	Meter (Hydrometer)	Extech Instruments	Datalogger 42270	08/12/2024	08/31/2025
WC084405	Cable (Test)	Fairview Microwave	GP0 RF N-Type	01/01/1900	NCR

Calibration Abbreviations
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End of Test Report