

CERTIFICATE CONCERNING DESIGN AND CONSTRUCTION OF ELECTRONIC SPEED MEASURING DEVICES

I, Katrina Sorich, do certify under penalty of the laws of the State of Washington that the following is true and correct:

I have been employed as a technician by American Traffic Solutions for 3 years. I became a speed validation technician in 2020 and have over 1200 hours performing speed validation tests. I am nationally certified as a RADAR and LIDAR operator. The City of Kirkland currently uses the AutoPatrolTM 3D radar fixed speed safety camera system, an electronic speed measuring device provided through a contract with American Traffic Solutions, Inc. ("ATS"). Part of my duties include monitoring regular testing of the AutoPatrol 3D radar fixed speed safety camera systems used by the City of Kirkland.

ATS contracted with the City of Kirkland to provide an Automated Speed Enforcement ("ASE") system designed to record the speed of a vehicle and obtain photographs or other recorded images of the vehicle and the vehicle's registration plate while the vehicle is traveling in excess of speed limits in certain safety zones within posted limits.

The ASE program includes the use of the AutoPatrol 3D radar fixed speed safety camera systems at the following locations within the City of Kirkland:

Location Code	Location Description	Lanes Monitored
KRKF001	NB 132ND AVE NE @ MUIR ELEMENTARY/KAMIAKIN MIDDLE	1
KRKF002	SB 132ND AVE NE @ MUIR ELEMENTARY/KAMIAKIN MIDDLE	1
KRKF003	EB 80TH ST @ ROSE HILL ELEMENTARY	1
KRKF004	WB 80TH ST @ ROSE HILL ELEMENTARY	1
KRKF005	SB 724 STATE ST @ LAKEVIEW ELEMENTARY SCHOOL	1
KRKF006	WB 10600 NE 68TH ST @ LAKEVIEW ELEMENTARY SCHOOL	1
KRKF007	NB 12637 84TH AVE NE @ SANDBURG ES / FINN HILL MS / THOREAU ES	1
KRKF008	SB 14006 84TH AVE NE @ SANDBURG ES / FINN HILL MS / THOREAU ES	1

The AutoPatrol 3D radar fixed speed safety camera system operates by measuring vehicle speed, as well as position relative to the radar to calculate and differentiate multiple vehicles in the radar beam. The speed of a moving vehicle is measured by Doppler radar. Doppler radar is a generally accepted technology used for measuring speed. The AutoPatrol 3D radar technology is used throughout the US and Europe as well as other countries and is approved by the Swiss national metrology institute- METAS.

The AutoPatrol 3D radar fixed speed safety camera system uses a tracking radar sensor for measuring vehicle speeds and detecting speed violations. The AutoPatrol 3D radar is aligned at a fixed angle across the road. The AutoPatrol 3D radar emits a horizontal beam over the road surface as represented by the illustration below. The tracking radar can simultaneously detect multiple vehicles and measure their speed, distance, angle and movement within the radar beam. The radar tracks multiple vehicles by reconstructing vehicle movement from the measured object speed, angle and distance values. If a vehicle passes a defined trigger line, the radar outputs the vehicle's speed and lane information. The camera connected to the tracking radar uses this

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information to determine if there is a speed violation and to capture photographs showing the measured speed and lane on the databar of the captured images.



The tracking radar utilizes the Doppler Effect for speed determination. If an electromagnetic wave is emitted at a moving object, then the wave is reflected back from the moving object. The frequency of the wave received back by the radar shifts based on the speed of the moving object and its direction of travel. The tracking radar continuously determines this frequency shift of each object to calculate the object's speed. The tracking radar consists of two receiving antennas integrated into a single radar sensor. This configuration allows the radar to measure the distance and angle of the vehicle relative to the position of the radar sensor. Illustration A and B show the measurement principle in simplified form. The radar sensor emits a radar beam (illustration A). The radar sensor evaluates the return frequency, as well as the phase difference of the reflected radar beam from both of the receivers. With the aid of these values the radar sensor calculates the vehicle position.



Prior to operation each day, the system performs a system self-test. This self-test performs an electronic tuning fork test to produce a specific frequency and returns an associated speed value. Only if the return value meets the acceptance criteria to show that the system is operating correctly will the system enter measure mode. Unless a self-test is successful, the system will not enter measure mode and no violations will be captured. Additional information stored as metadata within each image includes coordinates of the vehicle position at the time of capture. This information is extracted and utilized through a secondary speed verification process to provide yet another means to validate offender speed and position based on the two images obtained and image analytics. In addition to the internal system checks and the manufacturer calibration certification, the 3D radar system is subject to routine and independent calibration check of the speeds produced by the system at least annually by a qualified technician.

Each day the computer which controls the fixed speed safety camera system is rebooted. The reboot is initiated each day and each time the computer is rebooted an internal check is performed on all operations of

each fixed speed safety camera system, including the clocks, sensors, camera and speed calculating hardware and software, in order to verify that all operations are functioning correctly. When the internal check detects a problem with one of the operations on a given fixed speed safety camera system, then that particular fixed speed safety camera system is inactivated and a request for service is relayed to ATS support personnel. This means that violations cannot be issued until any internal problem is fixed.

Speed validation tests are regularly performed on each installed and operable AutoPatrol 3D radar fixed speed safety camera system. The test is conducted by having a LIDAR Operator obtain true measurements of up to five vehicles per lane in the ascending and/or descending direction. The speed of the vehicle is captured by the LIDAR Operator and then relayed via cellular to an ATS Technician. The ATS Technician then compares the vehicle speed measured by the AutoPatrol 3D radar fixed speed safety camera system to the speed measured by the LIDAR Operator to ensure the accuracy of the AutoPatrol 3D radar fixed speed safety camera system. ATS maintains the results of each test in a Validation Report. The speed validation for each system was performed on the following date and the systems at each location were found to be in proper working order:

Location Code	Location Description	Date of Test
KRKF001	NB 132ND AVE NE @ MUIR ELEMENTARY/KAMIAKIN MIDDLE	10/15/2024
KRKF002	SB 132ND AVE NE @ MUIR ELEMENTARY/KAMIAKIN MIDDLE	10/15/2024
KRKF003	EB 80TH ST @ ROSE HILL ELEMENTARY	10/3/2024
KRKF004	WB 80TH ST @ ROSE HILL ELEMENTARY	10/3/2024
KRKF005	SB 724 STATE ST @ LAKEVIEW ELEMENTARY SCHOOL	10/15/2024
KRKF006	WB 10600 NE 68TH ST @ LAKEVIEW ELEMENTARY SCHOOL	10/15/2024
KRKF007	NB 12637 84TH AVE NE @ SANDBURG ES / FINN HILL MS / THOREAU ES	10/15/2024
KRKF008	SB 14006 84TH AVE NE @ SANDBURG ES / FINN HILL MS / THOREAU ES	10/15/2024

Preventative maintenance, including visual inspections, is regularly performed on the AutoPatrol 3D radar fixed speed safety camera systems. Preventative maintenance activities include: cleaning of the cameras and housing, general site inspection of environment and road conditions, inspection of poles, bases and enclosures, and inspection of system cables and connections. The location and date that preventative maintenance is performed is recorded in the Preventative Maintenance Log, which along with the Validation Report(s) referenced above, is attached hereto.

I am a custodian, or otherwise qualified witness, as to the attached records. I make this declaration based on personal knowledge, and if called and sworn as a witness, I could and would testify as set forth in the following paragraph.

Attached as Exhibits are: Exhibit A - Speed Validation Reports, Exhibit B - Preventative Maintenance Logs, and Exhibit C - Annual System Verification Certificate for all AutoPatrol 3D radar fixed speed safety camera systems installed and used by the City of Kirkland. All documents and materials included as Exhibit A, Exhibit B and Exhibit C are authentic and are what they purport to be, and accurately describe the matters set forth therein. All such records are business records in that they are: (1) records kept in the ordinary course of business; (2) created at or near the time of the transactions or events reflected therein by, or based on information from, a person with knowledge of the transaction or events; and (3) kept as part of a regular business activity.

Based upon my education, training, experience, and knowledge of the AutoPatrol 3D radar fixed speed safety camera system, it is my opinion that the system is so designed and constructed as to accurately employ measurement techniques based on a division of distance over time in such a manner that it will give accurate measurements of the speed of motor vehicles.

I, Katrina Sorich, certify (or declare) under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

Dated this 6th day of November 2024 in Mesa, AZ

Katrina Sorich, Speed Validation Technician



Speed Validation Report Client: Kirkland, WA

Dates/Locations:

October 3, 2024

- KRKF003 EB 80TH ST @ ROSE HILL ELEMENTARY
 - o Radar Serial Number: 590-113/65637
- KRKF004 WB 80TH ST @ ROSE HILL ELEMENTARY
 - o Radar Serial Number: 590-112/60096

October 15, 2024

- KRKF001 NB 132ND AVE NE @ MUIR ELEMENTARY/KAMIAKIN MIDDLE
 Radar Serial Number: 590-112/61555
- KRKF002 SB 132ND AVE NE @ MUIR ELEMENTARY/KAMIAKIN MIDDLE
 - o Radar Serial Number: 590-113/61397
- KRKF005 SB 724 STATE ST @ LAKEVIEW ELEMENTARY SCHOOL
 - o Radar Serial Number: 590-113/65925
- KRKF006 WB 10600 NE 68TH ST @ LAKEVIEW ELEMENTARY SCHOOL
 - o Radar Serial Number: 590-113/65963
- KRKF007 NB 12637 84TH AVE NE @ SANDBURG ES / FINN HILL MS / THOREAU ES
 - o Radar Serial Number: 590-113/67020
- KRKF008 SB 14006 84TH AVE NE @ SANDBURG ES / FINN HILL MS / THOREAU ES
 - o Radar Serial Number: 590-113/68181

Equipment:

Pro-Lite Plus Handheld Lidar Serial Number: LP05509 Certification Date: October 27, 2023

Technicians: Lidar Operator: Charles Goodrich RLC Operator: Katrina Sorich

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> > 1

1330 W. Southern Ave. • Tempe, Arizona 85282 • TEL: 480.443.7000

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A speed validation test was conducted for the sites listed above. The Lidar Operator obtained true measurements of five vehicles per lane in the ascending and/or descending direction. Those speeds were obtained using a Kustom Signals Pro-Lite+ handheld Lidar instrument. The speed of the vehicle is captured by the Lidar Operator and then relayed via cellular to the RLC Technician. The RLC Technician is monitoring the vehicle speed at the Fixed Speed Camera system simultaneously to ensure the accuracy of the system. The speed validation tests performed on the above-listed dates confirmed the accuracy of the Fixed Speed Camera systems at each location.

I, Katrina Sorich, certify that the information contained in this report is true and accurate.

Signed: ______ Date: November 8, 2024 American Traffic Solution Katrina Sorich, Speed Validation Technician Speed Integrity Team



Certificate of Achievement
Speed Integrity Technician Has successfully completed the 16 hour course for Speed Integrity Technician
Technician. Through this course each participant is required to display the proper competency through written and practical examinations. In addition, this course certifies each participants as a Lidar operator.
Presented to: Charles Goodrich
This Day: March 29, 2010
American Traffic Solutions Matthew Giola Police Traffic Lasser/Radar Instructor MOLD Centrulate of Annexian Traffic Solutions, Inc., 7681 East Gray Road, Scottadale, AZ, 85280
Certificate of Achievement
Speed Integrity Technician Has successfully completed the course for Speed Inegrity Technician
This course encompasses all the necessary tasks required to perform the duties as a Speed Integrity Technician. Through this course each participant is required to display the proper competencies in Radar and Laser Technology. In addition, this course certifies each participants as a Lidar operator.

Presented to:

Katrina Sorich

This Day:

November 18, 2020



Type Yol

Tylor Yochim Radar Instructor

ROLD Certificate of Actoevement, 91.0

American Traffic Solutions, Inc., 7681 East Gray Road, Scottsdale, AZ 35260

Certificate # VCC-1118-AZ-01



	PB Electronics Inc.
	502 543-7032 <u>www.pbelectronics.com</u> Factory Authorized Calibration Center for Stalker, MPH, Kustom, Decatur and LTI
	Certificate of Calibration
	Manufacturer: Kustom Model: Pro-Lite Serial Number: LP05509
	I hereby certify that this Speed Measuring Device has been checked for accuracy and correctness of operation under my supervision. This Speed Measuring Device is certified accurately within +/- 0.5 mph in stationary mode using equipment traceable to National Institute of Standards and technology. The laser transmitter of this device has been tested and found to be within specified range for Laser
alanan ana ang ang ang ang ang ang ang ang	FCC License number PG-18-12552 Technician Signature
	Tuning Forks Serial Numbers: n/a Date: October 27, 2023
S S N B	



SELF-ACCURACY TEST Kustom Signals Pro-Lite+ Lidar Speed Measurement Tool DATE:October 3, 2024 Start of shift "Self-Diagnostic test" time:10:39 AM Start of shift Distance check:100' End of shift "Self-Diagnostic test" time:11:20 AM End of shift Distance check:100' City and State:Kirkland, WA Lidar Serial Number:LP05509 Certification Date:October 27th, 2023 ONED ATOP:Cherrien Coedright
DATE:October 3, 2024 Start of shift "Self-Diagnostic test" time:10:39 AM Start of shift Distance check:100'lidar End of shift "Self-Diagnostic test" time:11:20 AM End of shift Distance check:100' City and State:Kirkland, WA Lidar Serial Number:LP05509 Certification Date:October 27 th , 2023
Start of shift Distance check: 100' lidar End of shift "Self-Diagnostic test" time: 11:20 AM End of shift Distance check: 100' City and State: Kirkland, WA Lidar Serial Number: LP05509 Certification Date: October 27th, 2023
End of shift "Self-Diagnostic test" time: 11:20 AM End of shift Distance check:100' City and State:Kirkland, WA Lidar Serial Number: LP05509 Certification Date:October 27 th , 2023
City and State:Kirkland, WA Lidar Serial Number:LP05509 Certification Date:October 27 th , 2023
Certification Date:October 27 th , 2023
OPERATOR: Charles Goodrich
I, <i>Charles Goodrich</i> , certify that the Kustom Signals Pro-Lite+ Lidar speed measurement device was setup, tested, and operated in accordance with the manufactures specifications to include its self- diagnostic check.
Further, I certified that the self-check distance was completed and accurate.
Signature: Concernation March 2024







Date			10/15/2024		
Time			10:01 AM		
Site ID			KRKF001		
Location			Kirkland, WA		
			NB 132ND AVE NE @		
Address			MUIR ELEMENTARY/KAMIAKIN MIDDLE		
Posted Speed	l Limit		20MPH		
Trigger Speed	d Limit			26MPI	Η
Speed Type				Schoo	bl
Lidar Technic	ian		Charles Goodrich		
AutoPatrol Technician			Katrina Sorich		
Lidar Serial Number			LP05509		
Radar Serial I	Number		590-112/61555		
Detection Typ	be			Autopatrol-	Radar
Measure Mod	e Capture	A COLOR		Yes	
Photo enforce	ement signs	present	Yes		
Pass/ Fail			Pass		
Ascending or	Descending		Descending		
City Lane	Times	Lidar Speeds	AP Speeds	Delta	Comments
1	10.01.39	17	17	0	
1	10.01.52	24	24	0	
1	10.01.54	25	25	0	The superior of the superior
1	10.02.14	25	26	1	
1	10.02.20	24	24	0	





Date			10/15/2024			
Time			10:09 AM			
Site ID			KRKF002			
Location				Kirkland	, WA	
			SB 132ND AVE NE @			
Address			MUIR ELEMENTARY/KAMIAKIN MIDDLE			
Posted Speed	I Limit			20MP	H	
Trigger Speed Limit				26MP	Ή	
Speed Type				Scho	ol	
Lidar Technician			Charles Goodrich			
AutoPatrol Technician			Katrina Sorich			
Lidar Serial Number			LP05509			
Radar Serial N	Number	St. Carl	590-113/61397			
Detection Typ	be			Autopatrol	-Radar	
Measure Mod	e Capture			Yes		
Photo enforce	ement signs	present	Yes			
Pass/ Fail	1.2	144 - S. 11 - MA	Pass			
Ascending or	Descending		Descending			
City Lane	Times	Lidar Speeds	AP Speeds	Delta	Comments	
1	10.09.24	24	23	-1		
1	10.10.31	21	22	1		
1	10.10.47	29	29	0		
1	10.10.51	33	34	1		
1000	10.11.08	27	27	0		





Date			10/3/2024			
Time			10:44 AM			
Site ID			KRKF003			
Location			Kirkland, WA			
Address			EB 80TH ST @ ROSE HILL ELEMENTARY			
Posted Speed Limit			20MPH			
Trigger Speed	d Limit			26MPH	1	
Speed Type				Schoo	l	
Lidar Technic	ian			Charles Goo	odrich	
AutoPatrol Te	chnician		Katrina Sorich			
Lidar Serial N	umber		LP05509			
Radar Serial I	Number		590-113/65637			
Detection Typ	be	Section Sector	Autopatrol-Radar			
Measure Mod	e Capture		Yes			
Photo enforce	ement signs	present	Yes			
Pass/ Fail			Pass			
Ascending or	Descending		Descending			
City Lane	Times	Lidar Speeds	AP Speeds	Delta	Comments	
1	10.44.13	27	26	-1		
1	10.44.27	23	23	0		
1	10.46.19	24	24	0		
1	10.46.50	34	33	-1		
1	10.47.15	27	27	0		





Date			10/3/2024			
Time			11:12 AM			
Site ID			KRKF004			
Location			Kirkland, WA			
Address			WB 80TH ST @ ROSE HILL ELEMENTARY			
Posted Speed	l Limit		20MPH			
Trigger Speed	d Limit	JACAUSED & P		26MPH	1	
Speed Type				Schoo		
Lidar Technic	ian			Charles Goo	odrich	
AutoPatrol Te	chnician		Katrina Sorich			
Lidar Serial N	Lidar Serial Number			LP05509		
Radar Serial N	lumber		590-112/60096			
Detection Typ	be			Autopatrol-	Radar	
Measure Mod	e Capture			Yes		
Photo enforce	ement signs	present		Yes		
Pass/ Fail			Pass			
Ascending or	Descending		Descending			
City Lane	Times	Lidar Speeds	AP Speeds	Delta	Comments	
1	11.12.13	27	28	1		
1	11.12.49	21	22	1		
1	11.13.53	23	23	0		
1	11.15.06	23	24	1		
1	11.15.31	20	20	0		





Date			10/15/2024			
Time			11:43 AM			
Site ID				KRKF005		
Location				Kirkland, WA		
Address			SB 724 STATE ST @ LAKEVIEW ELEMENTARY SCHOOL			
Posted Speed	I Limit		20MPH			
Trigger Speed	d Limit			26MP	4	
Speed Type				Schoo	bl	
Lidar Technic	ian		Charles Goodrich			
AutoPatrol Te	chnician		Katrina Sorich			
Lidar Serial N	Lidar Serial Number			LP05509		
Radar Serial I	Number		590-113/65925			
Detection Typ	be			Autopatrol-	Radar	
Measure Mod	e Capture			Yes		
Photo enforce	ement signs	present	Yes			
Pass/ Fail			Pass			
Ascending or	Descending		Descending			
City Lane	Times	Lidar Speeds	AP Speeds	Delta	Comments	
1	11.43.36	35	36	1		
1	11.44.07	25	26	1		
1	11.44.11	23	24	1		
1	11.44.17	21	21	0		
1	11.44.26	28	28	0		





Date			10/15/2024		
Time			11:47 AM		
Site ID			KRKF006		
Location			Kirkland, WA		
			WB 10600 NE 68TH ST @		
Address			LAKEVIEW ELEMENTARY SCHOOL		
Posted Speed Limit			20MPH		
Trigger Speed	d Limit			26MF	Ч
Speed Type				Scho	ol
Lidar Technic	ian		Charles Goodrich		
AutoPatrol Technician			Katrina Sorich		
Lidar Serial N	umber		LP05509		
Radar Serial Number				590-113/	65963
Detection Typ	be	The Subscription		Autopatro	I-Radar
Measure Mod	le Capture			Yes	5
Photo enforce	ement signs	present	Yes		
Pass/ Fail			Pass		
Ascending or	Descending		Descending		
City Lane	Times	Lidar Speeds	AP Speeds	Delta	Comments
1	11.47.14	21	21	0	
1	11.47.42	9	10	1	
1	11.48.03	18	17	-1	
1	11.48.10	14	14	0	
1	11.48.44	23	24	1	





Date			10/15/2024				
Time				11:23	AM		
Site ID			KRKF007				
Location			Kirkland, WA				
				12637 84TH	AVE NE @		
Address	26.22.25		SANDBURG E	es / Finn Hi	LL MS / THOREAU ES		
Posted Speed	l Limit			20MP	Ч		
Trigger Speed	d Limit			26MP	Ч		
Speed Type				Scho	ol		
Lidar Technic	ian			Charles Go	oodrich		
AutoPatrol Technician				Katrina S	Sorich		
Lidar Serial Number				LP055	609		
Radar Serial Number				590-113/	67020		
Detection Type				Autopatro	l-Radar		
Measure Mode Capture				Yes			
Photo enforcement signs present				Yes	i		
Pass/ Fail				Pass	S		
Ascending or	Descending			Descen	ding		
City Lane	Times	Lidar Speeds	AP Speeds	Delta	Comments		
1	11.23.18	15	16	1			
1	11.25.09	27	27	0			
1	11.25.25	28	29	1			
1	11.25.52	28	28	0			
1	11.29.50	27	27	0			





Date			10/15/2024				
Time				11:17 A	M		
Site ID				KRKF0	08		
Location				Kirkland,	WA		
			SB	14006 84TH	AVE NE @		
Address			SANDBURG E	S / FINN HIL	L MS / THOREAU ES		
Posted Speed	l Limit			20MP	Н		
Trigger Speed	d Limit			26MPI	Н		
Speed Type				Schoo	bl		
Lidar Technic	ian			Charles Go	odrich		
AutoPatrol Technician				Katrina S	orich		
Lidar Serial Number				LP0550	09		
Radar Serial Number				590-113/6	8181		
Detection Type				Autopatrol-	Radar		
Measure Mode Capture				Yes			
Photo enforcement signs present				Yes			
Pass/ Fail				Pass			
Ascending or	Descending			Descend	ling		
City Lane	Times	Lidar Speeds	AP Speeds	Delta	Comments		
1	11.17.06	30	30	0			
1	11.18.34	22	23	1			
1	11.18.41	29	29	0			
1	11.19.27	25	25	0			
1	11.19.31	26	26	0	Bally and the second		



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1910-071EA

Revision:

Report No.:

N/C

Radar Sensor Calibration Verification Certificate of Calibration

Model: RRS24F-ST3

Part Number / Serial Number: 590-112 / 60096 Ex. 590-XXX / 6XXXX

Description: **Radar Characteristics Validation** In compliance with: RRS24F-ST3 Radar Sensor Calibration Verification Procedure Documentation (5030-0150)

> Date of Issue: August 16, 2024

Owner of EUT:

Verra Mobility 1150 N. Alma School Rd Mesa, AZ 85201

Attention of:

Engineering Department Phone: (480) 443-7000

Test Facility				
Test Laboratory	Keystone Compliance, LLC			
Address	131 North Columbus Innerbelt			
City, State, Zip Code	New Castle, PA 16101			
Email	questions@keystonecompliance.com			
Web Site	www.keystonecompliance.com			

Test Personnel			
Name	Alex Herrin		
Title	EMC Test Engineer		
Signature	Kar / and		

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Report No.: 1910-071EA

Revision:

N/C

Radar Sensor Calibration Verification Certificate of Calibration

Model: RRS24F-ST3

Part Number / Serial Number: 590-112 / 60096 Ex. 590-XXX / 6XXXX

Date of Issue: August 16, 2024

The frequency measurements performed and recorded within this report demonstrate that the JENOPTIK RR24F-ST3 radar has an accuracy of less than or equal to 0.62 mph in the range of 6.21 mph to 62.14 mph and an accuracy of 0.62 mph to 1.86 mph in the range of 62.14 mph to 186.41 mph. This is equal to or better than +/- 1 mph accuracy up to 100 mph, as specified by the manufacturer.

FSK Frequency Set 1						
Nominal Frequency	Measured Frequency	Amplitude	Frequency Deviation	Limit	Results	
(GHz)	(GHz)	(dBm)	(MHz)	(MHz)		
$f_0 = 24.08$	24.076975	20.3958297	-3.02	+/- 48.2	PASS	
f ₁ = 24.08725	24.08055	20.5084444	-6.70	+/- 48.2	PASS	
f ₂ = 24.089	24.08705	20.4310754	-1.95	+/- 48.2	PASS	
f ₃ = 24.09	24.088025	20.490436	-1.98	+/- 48.2	PASS	

	FSK Frequency Set 2						
Nominal Frequency (GHz)	Measured Frequency (GHz)	Amplitude (dBm)	Frequency Deviation (MHz)	Limit (MHz)	Results		
f _o = 24.12	24.118575	3.29224607	-1.43	+/- 48.2	PASS		
f ₁ = 24.12725	24.125725	3.07485649	-1.53	+/- 48.2	PASS		
f ₂ = 24.129	24.127675	4.31448647	-1.33	+/- 48.2	PASS		
f ₃ = 24.13	24.12865	4.65784644	-1.35	+/- 48.2	PASS		

	FSK Frequency Set 3						
Nominal Frequency (GHz)	Measured Frequency (GHz)	Amplitude (dBm)	Frequency Deviation (MHz)	Limit (MHz)	Results		
f _o = 24.16	24.15855	15.8666386	-1.45	+/- 48.2	PASS		
f ₁ = 24.16725	24.1657	16.0622447	-1.55	+/- 48.2	PASS		
f ₂ = 24.169	24.16765	17.4758736	-1.35	+/- 48.2	PASS		
f ₃ = 24.17	24.168625	17.465233	-1.38	+/- 48.2	PASS		

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Report No.: 1910-071EA

Revision:

N/C

Radar Sensor Calibration Verification Certificate of Calibration

Model: RRS24F-ST3

Part Number / Serial Number: 590-113 / 65637 Ex. 590-XXX / 6XXXX

Description: Radar Characteristics Validation In compliance with: RRS24F-ST3 Radar Sensor Calibration Verification Procedure Documentation (5030-0150)

> Date of Issue: August 15, 2024

Owner of EUT:

Verra Mobility 1150 N. Alma School Rd Mesa, AZ 85201

Attention of:

Engineering Department Phone: (480) 443-7000

Test Facility				
Test Laboratory	Keystone Compliance, LLC			
Address	131 North Columbus Innerbelt			
City, State, Zip Code	New Castle, PA 16101			
Email	questions@keystonecompliance.com			
Web Site	www.keystonecompliance.com			

Test Personnel			
Name	Alex Herrin		
Title	EMC Test Engineer		
Signature	Kan / Kan		

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Report No.: 1910-071EA

Revision:

N/C

Radar Sensor Calibration Verification Certificate of Calibration

Model: RRS24F-ST3

Part Number / Serial Number: 590-113 / 65637 Ex. 590-XXX / 6XXXX

Date of Issue: August 15, 2024

The frequency measurements performed and recorded within this report demonstrate that the JENOPTIK RR24F-ST3 radar has an accuracy of less than or equal to 0.62 mph in the range of 6.21 mph to 62.14 mph and an accuracy of 0.62 mph to 1.86 mph in the range of 62.14 mph to 186.41 mph. This is equal to or better than +/- 1 mph accuracy up to 100 mph, as specified by the manufacturer.

FSK Frequency Set 1							
Nominal Frequency Measured Frequency Amplitude Frequency Deviation Limit Res							
(GHz)	(GHz)	(dBm)	(MHz)	(MHz)			
$f_0 = 24.08$	24.078925	14.3348297	-1.07	+/- 48.2	PASS		
$f_1 = 24.08725$	24.086075	14.7614444	-1.17	+/- 48.2	PASS		
f ₂ = 24.089	24.088025	15.9120754	-0.98	+/- 48.2	PASS		
$f_3 = 24.09$	24.089	16.220436	-1.00	+/- 48.2	PASS		

FSK Frequency Set 2							
Nominal Frequency Measured Frequency Amplitude Frequency Deviation Limit Res							
(GHz)	(GHz)	(dBm)	(MHz)	(MHz)			
f _o = 24.12	24.118575	13.8122461	-1.43	+/- 48.2	PASS		
f ₁ = 24.12725	24.125725	14.1748565	-1.53	+/- 48.2	PASS		
f ₂ = 24.129	24.12735	15.3814865	-1.65	+/- 48.2	PASS		
f ₃ = 24.13	24.12865	15.6088464	-1.35	+/- 48.2	PASS		

	FSK Frequency Set 3						
Nominal Frequency Measured Frequency Amplitude Frequency Deviation Limit							
(GHz)	(GHz)	(dBm)	(MHz)	(MHz)			
$f_0 = 24.16$	24.158875	15.0456386	-1.13	+/- 48.2	PASS		
f ₁ = 24.16725	24.166025	15.1842447	-1.22	+/- 48.2	PASS		
f ₂ = 24.169	24.167975	16.3358736	-1.03	+/- 48.2	PASS		
f ₃ = 24.17	24.16895	16.478233	-1.05	+/- 48.2	PASS		

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V A VERRA MOBILITY	PREVENTIVE MAINT	ENANCE CHECKLIST
Date & Time: 10/28/2024 12:19:00 Site ID: KRKF003	Location: EB 80th St @ Rose H	ill Elementary
Product: AutoPatrol Technician Name: Thom	as Yuen	See Associated Ticket:
Item	Status I	Note/Action (If Status N/A, please specify)
1. Clean dirt, grime, and graffiti off enclosure and glass.		
1.1. Clean Graffiti.	N/A	
Check physical integrity. Check paint/housing for graffiti and (or) other vandalism.		
1.2. Clean Glass:	Pass	
Clean and inspect all glass and enclosures.		
1.3. Clean Enclosure (Interior):	N/A	
Clear vents/fans of obstruction. Remove dust and dirt by vacuum/wiping.		
1.4. Check Enclosure:	N/A	
If enclosure moved during cleaning, tighten base.		
2. Perform a general site inspection to include environmental and road conditions.		
2.1. PLP/Loop Loop:		
Check for exposed or cut loop wiring, and epoxy wear and tear.		
2.2. Power & Grounding:	N/A	
Inspect all power and grounding connections.		
2.3. Radar:	N/A	
Inspect radar and cables. Visually inspect antenna.		
2.4. WVDs:		
Check for popped out pucks, visible cracks, or other noticeable damage.		
3. Inspect poles, bases, and enclosures.		

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3.1. Pole: Check sturdiness. Check hurricane collar and confirm screws are tight.	N/A	
3.2. Base: Check for cracks. Ensure bolts (and latch bolt) are tight and secure inside base.	N/A	
3.3. Enclosure: Confirm straps are tight and secure against pole. Tighten if loose.	N/A	
4. Inspect cables and connections.		
4.1. Cables: Check all cables for visible wear or damage.	N/A	
4.2. Connections: Check for exposed wires on pole connecting to radar, camera enclosure, and strobe.	N/A	

5. Take (and attach) photo of enclosure, pole, and photo enforcement sign(s) for presence and damage.

5.1. Enclosure:



5.2. Pole:



5.3. Photo Enforcement Sign(s):





			KIRKLAND
VERRA V A VERRA MOBILITY	PREVENT	IVE MAIN'	TENANCE CHECKLIST
Date & Time: 10/28/2024 12:22:00 Site ID: K	RKF004 Location: WB 8	80th St @ Rose	Hill Elementary
Product: AutoPatrol	Technician Name: Thomas Yuen		See Associated Ticket:
Item		Status	Note/Action (If Status N/A, please specify)
1. Clean dirt, grime, and graffiti off enclosure and glass.			
1.1. Clean Graffiti.		N/A	
Check physical integrity. Check paint/housing for graffiti and (or)	other vandalism.		
1.2. Clean Glass:		Pass	
Clean and inspect all glass and enclosures.			
1.3. Clean Enclosure (Interior):		N/A	
Clear vents/fans of obstruction. Remove dust and dirt by vacuum	ı/wiping.		
1.4. Check Enclosure:		N/A	
If enclosure moved during cleaning, tighten base.			
2. Perform a general site inspection to include environmental and	d road conditions.		
2.1. PLP/Loop Loop:			
Check for exposed or cut loop wiring, and epoxy wear and tear.			
2.2. Power & Grounding:		N/A	
Inspect all power and grounding connections.			
2.3. Radar:		N/A	
Inspect radar and cables. Visually inspect antenna.			
2.4. WVDs:			
Check for popped out pucks, visible cracks, or other noticeable d	lamage.		
3. Inspect poles, bases, and enclosures.			

THIS DOCUMENT IS MAINTAINED AS A PUBLIC RECORD IN ACCORDANCE WITH RCW 5.44

3.1. Pole: Check sturdiness. Check hurricane collar and confirm screws are tight.	N/A	
3.2. Base: Check for cracks. Ensure bolts (and latch bolt) are tight and secure inside base.	N/A	
3.3. Enclosure: Confirm straps are tight and secure against pole. Tighten if loose.	N/A	
4. Inspect cables and connections.		
4.1. Cables: Check all cables for visible wear or damage.	N/A	
4.2. Connections: Check for exposed wires on pole connecting to radar, camera enclosure, and strobe.	N/A	

5. Take (and attach) photo of enclosure, pole, and photo enforcement sign(s) for presence and damage. A REAL

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5.1. Enclosure:

5.3. Photo Enforcement Sign(s):





