

Protocol for the Certification of Laboratories Performing Certification of Tuning Forks

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I. PURPOSE

The Department of General Services (DGS) Division of Consolidated Laboratory Services (DCLS) administers the program for the certification of laboratories performing tuning fork certification testing on behalf of DGS Division of Purchases & Supply which has statutory authority for the specification of traffic speed detection devices used by Virginia Police Chiefs, Sheriffs, and law enforcement authorities. The purpose of this certification program is to ensure that laboratories certifying tuning forks used for the calibration of traffic radar develop and maintain the necessary quality systems and procedures to produce legally defensible data.

The purpose of this protocol is to prescribe certification criteria for stationary and mobile laboratories performing tuning fork certification testing under the Code of Virginia Sections 2.2-1112 and 46.2-882.

II. SCOPE

The requirements of the program are applicable to all commercial and non-commercial laboratories and/or radio shops (hereafter, "laboratories") that certify tuning forks employed by law enforcement personnel to calibrate traffic speed detection devices used for the enforcement of speed limits.

Tuning forks must be certified at least once every six months. Certification may be performed by a laboratory certified by the Division of Consolidated Laboratory Services (DCLS) to evaluate and certify tuning forks used for testing the accuracy

of radar equipment used in the Commonwealth of Virginia according to the Code of Virginia Section 46.2-882 and the International Association of Chiefs of Police [IACP] standards. Specifically, DCLS evaluates tuning fork certification laboratories to ensure testing and certification of tuning forks is performed in accordance with Section 1221.71 of the National Highway Traffic Safety Administration (NHTSA) document “Model Minimum Performance Specifications for Police Traffic Radar and Lidar Devices” [NHTSA DOT HS 808-069, hereafter NHTSA Model Minimum Performance or NHTSA MMP]. An additional NHTSA document, “Speed Measuring Device Performance Specifications: Across-the-Road Radar Module” [NHTSA DOT HS 810-845] also provides a comparable description of the tuning fork calibration procedure. Tuning forks may also be returned to the manufacturer for certification.

Stationary and mobile tuning fork laboratories operating in Virginia must be certified by DCLS through a process requiring an evaluation of the facility at least once every three years. Mobile operations are considered separate stand-alone laboratories and are subject to separate inspections.

This document describes the DCLS protocols for the utilization of on-site laboratory assessments to certify, continue certification, and recertify those laboratories performing tuning fork certification testing in Virginia. Remote assessments using videoconferencing in conjunction with a complete data packet, as requested, may be substituted for an on-site assessment if approved per Laboratory Assessment Procedures, 1VAC30-45 and 1VAC30-46 (6857).

III. DEFINITIONS

“Tuning Fork” means a mechanical self-resonant device, which when excited, produces free oscillations that may be used to generate a pseudo Doppler frequency reference when placed in the radar antenna beam. [NHTSA MMP §1221.4] A mechanical self-resonant tuning fork is also referred to in this document as a conventional or traditional or mechanical device. A tuning fork may also be a Kustom Signals Eagle 3 electronic tuning fork (ETF) which uses a crystal-based oscillator and a mixing diode to produce an electronic signal comparable to that of a conventional tuning fork. The signal from the ETF is indistinguishable by the Eagle 3 radar from the signal of a conventional tuning fork. Refer to Appendix A and Section V. B.11.f of this protocol for the specific procedure for certification of the Eagle 3 ETF. This protocol revision does not address any other brand/make of ETF.

NOTE 1: The Eagle 3 ETF is approved for use in Virginia at this time only for calibrating or verifying the Kustom Signals Eagle 3 radar as specifically directed in the Eagle 3 Operator’s Manual.

NOTE 2: A tuning fork facility must specify its request for certification of the

Eagle 3 ETF process to be approved to test and certify this piece of equipment. See Section V.C.4 for more information on adding to a laboratory's scope of certifications.

"Standard Test Conditions" means the ambient temperature shall be between 20°C (68°F) and 30°C (86°F) and the relative humidity shall be between 10 and 85 percent. [NHTSA MMP §1221.31] Note: The Eagle 3 ETF is not impacted by typical temperature fluctuations; its operational range is -22° to +140° F per the Eagle 3 Operator's Manual.

"Nominal value" means the numerical value of a device characteristic as specified by the manufacturer. [NHTSA MMP §1221.4]

Nominal Ka microwave frequencies by manufacturer:

- 1) Decatur / KSI: 35.5 GHz
- 2) MPH: 33.8 GHz
- 3) Stalker: 34.7 GHz

"K-band radar" means a speed measuring radar device designed to operate in the 24 050 to 24 250 MHz frequency band. [NHTSA MMP §1221.4]

"Ka-band radar" means a speed measuring radar device designed to operate in the 33 400 to 36 000 MHz frequency band. [NHTSA MMP §1221.4]

"X-band radar" means a speed measuring radar device designed to operate in the frequency band of 10 500 to 10 550 MHz. [NHTSA MMP §1221.4]

"Type I radar device" means a radar device that transmits microwave energy in the 10 500 to 10 550 MHz frequency band (in the X-band) and operates only in the stationary mode. [NHTSA MMP §1221.4]

"Type II radar device" means a radar device that transmits microwave energy in the 10 500 to 10 550 MHz frequency band (in the X-band) and operates in both the stationary and moving modes. [NHTSA MMP §1221.4]

"Type III radar device" means a radar device that transmits microwave energy in the 24 050 to 24 250 MHz frequency band (in the K-band) and operates only in the stationary mode. [NHTSA MMP §1221.4]

"Type IV radar device" means a radar device that transmits microwave energy in the 24 050 to 24 250 MHz frequency band (in the K-band) and operates in both the stationary and moving modes. [NHTSA MMP §1221.4]

"Type V radar device" means a radar device that transmits microwave energy in the 33 400 to 36 000 MHz frequency band (in the Ka-band) and operates only in the stationary mode. [NHTSA MMP §1221.4]

“Type VI radar device” means a radar device that transmits microwave energy in the 33 400 to 36 000 MHz frequency band (in the Ka-band) and operates in both the stationary and moving modes. [NHTSA MMP §1221.4]

IV. BACKGROUND INFORMATION

- A. The Virginia Department of General Services Division of Purchases and Supply (DPS) has authorized for use by law enforcement authorities in the Commonwealth of Virginia the current Conforming Product List (CPL) on the website of the National Highway Traffic Safety Administration at <https://www.nhtsa.gov/document/conforming-product-list-cpl-speed-measuring-devices> Equipment on this list conforms to NHTSA's Model Minimum Performance document.
- B. The NHTSA Model Minimum Performance document describes the expectation that each tuning fork will be accompanied by a calibration certificate including as a minimum the serial number of the tuning fork, the nominal design speed, a frequency calibration at 21°C (70°F), the microwave frequency band for which it is to be used (X, K, or Ka), the calibrated frequency and associated radar speed in mph or km/h, and any correction factor that must be applied to the 21°C (70°F) calibration speed when used at another temperature. [NHTSA MMP §1221.12 (b).] Note: The Eagle 3 ETF is not impacted by typical temperature fluctuations; its operational range is -22° to +140° F per the Eagle 3 Operator's Manual.
- C. The NHTSA Model Minimum Performance document describes the expectation that each conventional tuning fork manufacturer shall permanently mark each tuning fork with a serial number, the radar frequency band that is to be used with (X, K, or Ka), and a nominal stationary model radar speed specification including units (km/h or mph). Each Ka-band tuning fork shall also be permanently marked with the nominal microwave frequency of its radar device or marked with a code representing the same. [NHTSA MMP §1221.13 (a)] Note: The Eagle 3 ETF serial number on the remote control is used as its unique identifier. Other markings as expected for conventional tuning forks are not expected on the Eagle 3 ETF device.
- D. The use of the appropriate frequency calculation is the responsibility of the laboratory performing tuning fork certification.
- E. Ka-band radar devices approved for use in the Commonwealth of Virginia may operate at 33.8 GHz, 34.7 GHz, or 35.5 GHz. Tuning fork certification laboratories should ensure either that all appropriate Ka-band reference tuning forks are available prior to performing conventional tuning fork certification

testing or define in the Quality Manual the scope of testing available to Virginia customers.

- F. Eagle 3 radar units and corresponding Eagle 3 ETF devices may be programmed differently for calibration procedures depending on configuration requirements of a specific state for which their use is intended. In Virginia, the Eagle 3 radar units and Eagle 3 ETF devices are programmed for calibration at two of the speeds indicated in the chart below:

Band	Speed	Frequency (Hz)
Ka	30 mph	3208
Ka	35 mph	3737
Ka	55 mph	5892
Ka	65 mph	6961

Note: This chart is excerpted from the expanded chart found in the Eagle 3 Service Bulletin 1765 Rev A (Appendix A).

- G. Certification laboratories may not make adjustments to customers' tuning forks that fail to meet acceptance criteria. Tuning forks may only be certified or rejected.

V. REQUIREMENTS FOR CERTIFICATION

- A. Initial Application - Requests for certification shall be made to DCLS using the current application, Tuning Fork Laboratory Application for Certification (6958). DCLS will send an application to each requesting laboratory. The application may also be downloaded from the DCLS web site at <https://dgs.virginia.gov/DCLS>.

Addition / Expansion to Initial Application – To request to expand the laboratory's existing tuning fork certification to include the Eagle 3 ETF certification, submit the following:

1. The laboratory's training procedure for the Eagle 3 ETF (per section V.B.12), usually within the Quality Manual or related Standard Operating Procedure
2. At least one analyst's Demonstration of Capability (DOC) record (per section V.B.13), usually Form 55131 or a comparable substitute
3. An example (or mock) certificate demonstrating an Eagle 3 ETF certification

NOTE: REFER TO SECTION V.C.4 REGARDING FEES FOR ADDITIONS TO AN APPLICATION FOR THE EAGLE 3 ETF. Fees will be invoiced after receipt of the request for the addition to the application.

B. The laboratory must submit a Quality Manual with the completed application. At a minimum, the following information must be included or referenced in the Quality Manual:

1. Company name and address,
2. Statements affirming the laboratory's commitments to quality assurance and data integrity.
3. Minimum qualifications for personnel performing tuning fork calibrations, including education and any specialized training in communications electronics, radar calibration and repair, or frequency measurement.
4. Log of printed names, handwritten initials and signatures of all laboratory personnel authorized to perform tuning fork testing, data review, and/or certificate notarization.
5. List of all testing equipment by manufacturer, model number, and serial number used in the certification procedure.
6. Information describing the accuracy, range, and reproducibility for each instrument and item of support equipment used for the testing and certification of tuning forks. An excerpt from the instrument manual with this information will satisfy this requirement. The Eagle 3 ETF procedure, if requested for certification, must be specified and performed in accordance with Kustom Signals Service Bulletin 1765 Rev A and Section V. B.11.f of this Protocol. The service bulletin may be included in the quality manual along with additional instructions from Section V.B.11.f to address this requirement.
7. Corrective Action Policy for response when instrumentation fails to meet fitness for use acceptance criteria.
8. Schedules for instrument calibration and maintenance including requirements for documentation of calibration and maintenance.
9. Description of circumstances that would require recertification of reference tuning forks, such as trauma or damage to the fork, or when the reference fork evaluation criteria cannot be met or demonstrates a trend of change

in performance.

10. Description of processes and procedures for ensuring traceability of measurements to nationally recognized standards.

This description may include the calibration tone source by name, address, and telephone number or other means of documenting traceability.

Processes and procedures may include daily evaluation of equipment against a standard signal from WWV but are not limited to that mode, provided that traceability of measurements can be otherwise demonstrated to the satisfaction of DCLS. [WWV is the call sign of the National Institute of Standards and Technology (NIST) radio station located in Fort Collins, Colorado. The station operates in the high frequency (HF, also known as shortwave) portion of the radio spectrum and broadcasts time and frequency information 24 hours per day, 7 days per week.]

NOTE: If the laboratory's list of equipment includes a Tuning Fork Gauge, the instrument may be verified via the NIST telephone signal using a telephone connection pickup coil [NIST SOP 22 §2.5.2].

11. Description of procedures being performed, equipment being used, calculations, and examples, adjustments (if any), and references. This information may be included in the Quality Manual or may be a separate Standard Operating Procedure (SOP). At a minimum, the information shall include the following:
 - a. Sample receiving and tracking procedures;
 - b. Sample Rejection Policy describing the circumstances under which a tuning fork would not be accepted for testing.
 - c. Procedures for labeling and disposition of tuning forks that are rejected before testing.
 - d. Step-by-step instructions for instrument setup, instrument fitness for use testing and documentation and acceptance criteria;
 - i. For conventional tuning fork testing: The instruction for instrument fitness for use testing will be evaluated to be in accordance with the tuning fork calibration test procedure [NHTSA MMP §1221.71] to include striking the tuning fork on a nonmetallic object and waiting for a stable output before recording the observed frequency. NHTSA §1221.71 states: "Strike the tuning fork on a nonmetallic object then hold it in front of the microphone while adjusting the synthesizer frequency to obtain a stationary, circular, Lissajous pattern on the oscilloscope."
 - ii. For Eagle 3 ETF testing: The instruction for instrument fitness for

use testing will be evaluated to be in accordance with the Kustom Signals Service Bulletin 1765 Rev A, as included at Appendix A of this protocol or as issued in a more recent revision by the manufacturer. The fitness for use testing will also be evaluated to conform with Section V. B.11.f of this protocol.

- e. The procedure and criteria for testing conventional tuning forks submitted by law enforcement agencies for certification and documenting test results, to include:
 - i. time to be allowed for tuning forks to come to temperature equilibrium with the test environment (equilibration may require up to 2 hours) [NIST SOP 22 §2.3.1];
 - ii. reference tuning forks tested prior to beginning testing and at the conclusion of each day on which testing occurred;
 - iii. at a minimum, the frequency of oscillation of each reference tuning fork shall be within $\pm 0.5\%$ of that specified by the manufacturer or the most recent independent certification [NHTSA MMP §1221.14];
 - iv. temperature of the test environment recorded prior to testing each sample set and at the end of the sample set;
 - v. temperature of the test environment not less than 20°C and not greater than 30°C ; [see NOTE below section viii]
 - vi. a minimum of 2 frequency observations recorded and averaged for the calculation of MPH (miles per hour);
 - vii. a description of calculations used, with sufficient detail to ensure the report produced by the analyst can be verified by reconstructing the calculation

Operating frequencies and calculations:

K band: 24,050 MHz

K band speed, mph = Average observed frequency (Hz) / 72.0301

Ka band: 33,400 MHz to 36,000 MHz

Ka band speed, mph = Average observed frequency (Hz) / (2.983135 x nominal microwave frequency, GHz) [NHTSA MMP §1221.71]

[NOTE: mph x 1.609344 = kph]

Nominal Ka Microwave frequencies by manufacturer:

Decatur / KSI: 35.5 GHz

MPH: 33.8 GHz

Stalker: 34.7 GHz

- viii. each page of test documentation dated and initialed by the analyst.
- ix. Certification of a conventional tuning fork may occur when the tuning fork has demonstrated frequencies within $\pm 0.5\%$ of the fork's nominal value.

NOTE: “Standard Test Conditions” as defined by NHTSA MMP §1221.31 includes specification of both temperature (between 20°C and 30°C) and relative humidity (RH) (between 10% and 85%). Indoor, air-conditioned or heated laboratory environments which meet the required temperature range generally address humidity extremes that would exceed the range specified. A laboratory should consider monitoring humidity at the testing site if the possibility of exceeding the specified range is suspected.

- f. The procedure and criteria for testing Eagle 3 ETFs submitted by law enforcement agencies for certification and documenting test results (if applicable to the laboratory’s certification), to include:
 - i. a minimum of two repetitions of the procedure described in Service Bulletin 1765 Rev A (Appendix A) wherein the remote control cycles through a programmed sequence of signals, emitting two different frequencies when the control button is pushed the first and second times in the cycle.
 - The resulting duplicate readings for each speed level (e.g., two readings corresponding to 35 mph and two readings corresponding to 65 mph) typically agree (match).
 - Should the readings for each speed not agree (match), a third repetition should be performed, and the three values averaged.
 - Failure of the readings to agree is not typical for the Eagle 3 ETF and the device may need further evaluation to ensure the device’s stability and expected performance and/or to ensure the stability of the frequency counter
 - ii. each page of test documentation dated and initialed by the analyst.
 - iii. A laboratory testing ONLY the Eagle 3 ETF is not required to maintain records of Standard Test Conditions.
 - iv. Conventional/mechanical reference tuning forks are not required for certification of the Eagle 3 ETF.
 - v. Certification of the Eagle 3 ETF may occur when the ETF has demonstrated matching frequencies (or the average of three frequencies) within 5 Hz of the value designated in the Kustom Signals Service Bulletin 1765 Rev A, also shown below.

Band	Speed	Frequency (Hz)
Ka	30 mph	3208
Ka	35 mph	3737
Ka	55 mph	5892
Ka	65 mph	6961

- g. Processes for reviewing and reporting test data and calculations, to include:
 - i. for conventional tuning forks, verification that measurements of the reference tuning forks were within the acceptance criteria of $\pm 0.5\%$ of the most recent certified values;
 - ii. review of the new certificate generated by the lab against the raw test data and sample submission information for each tuning fork tested;
 - iii. verification that the tested item meets the certification criteria for a conventional tuning fork (Section V.B.11.e.ix) or for the Eagle 3 ETF (Section V. B.11.f.v), or is reported to be NOT CERTIFIED;
 - iv. data review documented with date and initials of reviewer;
 - v. final reports notarized;
 - h. Processes for customer notification as well as labeling and disposition of tuning forks that fail the certification testing.
12. A training procedure that clearly describes the complete training process and supporting documentation. Training for both conventional and electronic tuning fork certification must be addressed. Elements of such a procedure shall include:
- a. Training Goal - a concise statement identifying the overall training goal and results expected.
 - b. Learning Objectives - a clear statement of the capabilities expected of the technician upon completion of the training.
 - c. Learning Methods and/or Activities - specific actions facilitating the achievement of the learning objectives.
 - d. Documentation - evidence, with signatures and dates, that the learning activities were performed and evaluated.
 - e. Criteria - specific measures and criteria indicating the effectiveness of the training.
 - f. Evaluation - an assessment of the documentation against the criteria to determine whether the learning objectives were achieved, or whether additional training may be necessary.
- NOTE: Tuning fork laboratories certified for Eagle 3 ETF certification may use Form 55131 available at <https://dgs.virginia.gov/division-of-consolidated-laboratory-services/certification-accreditation/tuning-fork-facilities/> to document a staff member's completed training (i.e., Demonstration of Capability per Section V.B.13). Due to the simplicity of the Eagle 3 ETF procedure, a laboratory's training procedure may be written in a manner that consolidates elements a through f, above.
13. A Demonstration of Capability (DOC) procedure that outlines a procedure for establishing technician competence in testing and establishes

acceptance criteria for the evaluation of analyst capability.

a. For conventional tuning fork DOC:

- Perform a minimum of 20 consecutive frequency observations of each reference tuning fork.
- Calculate the mean and standard deviation of each data set.
- At a minimum, the frequency of oscillation of each reference tuning fork shall be within $\pm 0.5\%$ of that specified by the manufacturer or the most recent independent certification.

b. For Eagle 3 ETF DOC:

- Demonstrate correct identification of the test point location (TP5) and the ground of the remote control device per Kustom Signals Service Bulletin 1765 Rev A (Appendix A).
- Perform a minimum of 5 consecutive cycles per Kustom Signals Service Bulletin 1765 Rev A (Appendix A), recording two frequency readings (e.g., corresponding to 35 mph and 65 mph) for each cycle.
- The resulting 5 replicates are expected to agree (match).
- Failure of the readings to agree (match) is not typical for the Eagle 3 ETF and the device may need further evaluation to:
 - ensure the device's stability and expected performance and/or
 - ensure the stability of the frequency counter.
- At a minimum, the demonstrated frequencies (or, if not matching, their average) shall be within 5 Hz of the value designated in the Kustom Signals Service Bulletin 1765 Rev A for the speeds applicable in Virginia (e.g., 35 mph and 65 mph).

Band	Speed	Frequency (Hz)
Ka	30 mph	3208
Ka	35 mph	3737
Ka	55 mph	5892
Ka	65 mph	6961

14. Recordkeeping Policies and Practices

a. The following records shall be retained for a minimum of three years:

- i. Maintenance logs;
- ii. Calibration records;
- iii. Sample observation records;
- iv. Training records and Demonstrations of Capability.

b. Documentation practices

- i. All handwritten data shall be recorded in ink;
- ii. Changes to laboratory records shall be made with a single

- strike-out line leaving the original entry visible;
 - iii. Changes shall be documented with date and initials of person making the correction.
 - c. Electronic Records
The laboratory shall describe procedures for ensuring the security and integrity of electronic records.
15. A sample copy of a certificate issued to customers as it relates to tuning fork certification, which shall include the following information:
- a. Serial number or other unique identifier of the tuning fork;
 - b. The frequency at which the tuning fork was found to oscillate and the corresponding MPH (miles per hour);
 - c. The designation of the radar frequency band within which the tuning fork is to be used;
 - d. Date of certification testing;
 - e. Signature of the analyst who performed the testing;
 - f. Date, seal and signature of notarization;
 - g. Any additional information required by the court system(s) of the jurisdictions in which the laboratory's clients are located.
16. Change sheet to allow historic reconstruction of changes to the Quality Manual.
17. Annual Review and signature sheet.

C. Fee

1. For the purpose of laboratory certification, separate applications and fees are required for each mobile laboratory as well as each stationary laboratory.
2. The application fee of three hundred twenty dollars (\$320.00), payable to the Treasurer of Virginia, must accompany each application and is non-refundable and not pro-rated. The application fee is subject to change.
3. A certification renewal fee of three hundred twenty dollars (\$320.00) is payable annually for each mobile laboratory and each stationary laboratory. The annual fee is payable upon receipt of the invoice.
 - a. The annual renewal fee is subject to change if needed to cover program costs.
 - b. In addition to annual renewal fees, a tuning fork laboratory located outside of Virginia will be responsible for reasonable travel costs associated with conducting an on-site assessment of the laboratory. Reasonable travel costs include assessor labor for time spent in travel and costs associated with transportation, lodging, and per diem.

- c. All Tuning Fork Laboratory Certificates will expire September 30 of each year. New certificates will not be issued unless payment has been received.
4. A currently certified tuning fork facility may request the addition of the Eagle 3 ETF to its scope of certifications. A one-time change-in-scope fee of \$200 will be charged to cover the labor associated with this update and will be invoiced to the laboratory after receipt of the change-in-scope request. The fee includes review of the requested change-in-scope information with a remote assessment during which the certified facility will use video conferencing to demonstrate the ETF certification procedure per the Kustom Signals Service Bulletin 1765 Rev A (Appendix A). If video conferencing is not available or is not satisfactory to the DCLS Certification Officer, the laboratory will be responsible for reasonable travel fees and associated labor at the rate of \$70/hour. DCLS may opt to hold in-person assessments in lieu of remote assessments, at its own expense.

NOTE: A facility must have an Eagle 3 ETF (specifically, the remote control device) available on-site (may be owned or borrowed) to participate in a remote assessment of the certification procedure. See Section X.L for information on obtaining the Eagle 3 ETF device.

- D. The completed initial application, including the Quality Manual, should be submitted by email to Lab_Cert@dgs.virginia.gov (preferred) or mailed to
- Laboratory Certification Group
Division of Consolidated Laboratory Services
600 North 5th Street
Richmond, VA 23219

The laboratory will be invoiced for the annual fee after receipt of the application for initial certification. Fees are due with a new application and annually thereafter for the certification period of October 1 – September 30. Initial fees are not prorated.

For a change-in-scope (i.e., addition of the Eagle 3 ETF separately from the initial application or annual renewal cycle), the change-in-scope fee will be invoiced after receipt and processing of the request.

E. Application Review

1. Electronically submitted documents and/or hard copy application submissions will be collected for review by the Certification Officer.
2. After all necessary documents have been received, the completed application packet and the Quality Manual will be reviewed by the DCLS

Certification Officer within 60 days.

3. Based on the review of the application, one of the following responses will be initiated within 60 days of application receipt:
 - a. The laboratory will be contacted by telephone or e-mail to schedule the on-site inspection and complete the certification process.
 - b. The laboratory will be contacted by telephone or e-mail to correct minor problems or obtain clarification. Changes in the application agreed upon by the laboratory will be dated and initialed. Minor changes may be submitted by fax or e-mail during the review process.
 - c. Additions and/or corrections must be submitted to DCLS within 60 days to complete the application.
4. Failure to complete the application within the specified time will delay the review process and may result in denial of certification.

VI. ON-SITE INSPECTION AND REPORT

A. Initial On-Site Inspection

1. Upon arrival at the facility, the Certification Officer will conduct an Opening Conference with the responsible laboratory official(s) or his/her designee. The laboratory official(s) may invite additional staff members to attend.
2. The laboratory operations, quality system, equipment, personnel, standard operating procedures and record keeping practices will be inspected in accordance with Tuning Fork Laboratory Inspection Checklist (6954). The checklist can be accessed on the DCLS website at www.dgs.virginia.gov/DCLS.
3. At each triennial inspection, the laboratory's corrective actions from the previous inspection will be evaluated. A laboratory demonstrating repeat finding(s), i.e., finding(s) from a previous inspection that were not corrected in accordance with the corrective action plan for that inspection, may be recommended for decertification. Failure to implement and maintain corrective actions to satisfy certification program requirements jeopardizes a laboratory's certification status.
4. At each triennial inspection, the Certification Officer will review all documentation associated with one or more certification data set(s) selected during the inspection.
5. Laboratory personnel will be asked to demonstrate equipment fitness for use and tuning fork certification tests, either conventional tuning forks or Eagle 3 ETFs, or both, during the on-site inspection. (Refer to Section V.B.11.d.)

6. The Certification Officer will meet with the responsible laboratory official(s) or his/her designee following the assessment for an informal debriefing and discussion of potential findings. The laboratory leadership may invite additional staff members to attend.
 7. Following the on-site inspection a comprehensive report will be prepared by the DCLS Certification Officer and reviewed and issued by the Group Manager or Director of Laboratory Operations. The inspection report will be issued within 30 days of the on-site inspection and will document the Certification Officer's findings and may offer recommendations for improvements to the laboratory's quality system and the legal defensibility of the laboratory's data.
 8. The laboratory seeking certification must respond to findings noted in the report within sixty (60) days. The response must describe the corrective action taken and include documentation demonstrating that corrective action has been implemented to satisfactorily address the finding(s).
 9. Within thirty (30) days of receiving documentation demonstrating that all corrective action requirements have been satisfied, a certificate will be issued to the laboratory seeking initial certification. The certificate will be effective until the date of the next annual certificate renewal date (October 1 of each year).
- B. Each laboratory that desires to maintain uninterrupted certification shall be inspected triennially.
1. An on-site inspection, as described in section VI. A, will be conducted at each laboratory at least once every three years. A notice of the triennial inspection, scheduled for a mutually agreed-upon date, will be sent to the laboratory approximately 30 days before the inspection date and will include a request for the information listed in VI. B. 2.
 2. Prior to the on-site inspection, the laboratory shall provide DCLS with the following documentation:
 - a. A copy of the laboratory's current Quality Manual, and any/all documents referenced by the Quality Manual.
 - b. A copy of Tuning Fork Laboratory Quality Manual Checklist (6957), filled out by the laboratory, designating the location of each required item in the laboratory's quality documentation.
 - c. A current list of laboratory personnel;
 - d. A current list of laboratory equipment used for the testing of tuning forks.

- e. A current, approved Standard Operating Procedure (SOP) for the testing of tuning forks, if the test procedure is maintained separately from the Quality Manual.
- 3. The laboratory's quality manual will be evaluated prior to the site visit using Tuning Fork Laboratory Quality Manual Checklist (6957).
- 4. Following each on-site inspection a comprehensive report will be prepared by the DCLS Certification Officer within thirty (30) days.
- 5. The laboratory must respond to findings noted in the report within sixty (60) days.
- 6. Upon demonstration of satisfactory corrective action, DCLS will acknowledge receipt of satisfactory corrective action responses and the inspection will be closed. The laboratory will then be eligible for renewal of certification.
- C. DCLS reserves the right to perform announced or unannounced interim inspections.
- D. If on-site inspections are refused, DCLS may revoke certification.
- E. Refer to Laboratory Assessment Procedures, 1VAC30-45 and 1VAC30-46 (6857). Sections titled, "Assessment Issue: Improper or Potentially Illegal Activities", "Assessment Issue: Termination of On-Site Assessment", "Assessment Issue: Confidential Business Information", "Assessment Issue: National Security Considerations", and "Assessment Issue: Safety and Health Considerations" may be deemed applicable to site visits done under this protocol.

VII. CERTIFICATE

A certificate, valid for a period of one year, will be issued to each certified laboratory in good standing on or by October 1 of each year.

Certificates issued after the effective date of Revision 8 of this Protocol will include an indication on the certificate regarding the type of tuning fork certifications approved by DCLS for the facility, designated as one or both of the following:

- Conventional Mechanical Tuning Fork
- Eagle 3 Electronic Tuning Fork

VIII. MAINTENANCE OF CERTIFICATION

- A. The laboratory must notify DCLS within thirty (30) days of changes in personnel, procedures, equipment or laboratory location.

- B. A certification renewal fee, as described in Section V.C.3, is payable annually for each mobile laboratory and each stationary laboratory.
- C. An on-site inspection, as described in Section VI, will be conducted at each laboratory at least once every three years.

IX. RENEWAL OF CERTIFICATION

- A. Renewal invoices will be sent out on or before August 1 of each year.
- B. Annual certificate re-issuance is based on timely receipt of payment and satisfactorily completing an on-site inspection on a triennial basis.

X. REFERENCES

- A. Tuning Fork Laboratory Inspection Checklist (6954)
- B. Tuning Fork Laboratory Application for Certification (6958)
- C. DOT HS 810 845, "Speed Measuring Device Performance Specifications: Across-the-Road Module," U. S. Department of Transportation, National Highway Traffic Safety Administration, October 2007
- D. DOT HS 809 812 266, "Speed Measuring Device Performance Specifications: Down-the-Road Module," U. S. Department of Transportation, National Highway Traffic Safety Administration, April 2016
- E. DOT HS 808-069, "Model Minimum Performance Specifications for Police Traffic Radar and Lidar Devices", U. S. Department of Transportation, National Highway Traffic Safety Administration, January 1994
- F. Tuning Fork Laboratory Quality Manual Checklist (6957)
- G. Virginia Division of Purchases and Supply (DPS) Directive re: VA Standard 680-77 (current revision; maintained on DPS website, [Standards & Specifications \(virginia.gov\)](#))
- H. Conforming Products List published by the International Association of Chiefs of Police (IACP) (current revision; referenced from IACP website, <https://www.nhtsa.gov/document/conforming-product-list-cpl-speed-measuring-devices>)
- I. NIST.IR 8250, SOP 22, Standard Operating Procedure for Calibration of Traffic Speed Gun Tuning Forks and other Acoustic Frequency Emitting Devices <https://www.nist.gov/system/files/sop-22-tuning-forks-and-freq-inst-20190517.pdf>
- J. Kustom Signals, Inc Eagle 3 Radar Operator's Manual: <https://kustomsignals.com/service-and-support/operators-manuals>
- K. Kustom Signals, Inc Eagle 3 Service Bulletin 1765 Rev A: <https://kustomsignals.com> (available upon request)
- L. Kustom Signals Eagle 3 Wireless Remote Control Kit (includes remote control, batteries, and certification), Part Number 050-0001-10, Kustom Signals Parts Department – Phone 800-835-0156 Ext 2406 or refer to the Kustom Signals

website (<https://kustomsignals.com>) for information

YELLOW HIGHLIGHTS indicate changes in the document since its last revision.

APPENDIX A

(Appendix A was updated with Service Bulletin 1765 Rev A on 6/26/2024)



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Service Bulletin

Number: 1765 Rev A
Date Issued: September 4, 2018
Date Revised: **April 9, 2024**
Product Affected: Eagle 3 Remote Control Certification
Reason for Bulletin: Procedure on how to Certify the Remote Control Oscillator Outputs

Serial Numbers: Applies to all units.

Description:

This bulletin outlines the procedure to certify the remote control for the Eagle 3.

Background:

The Eagle 3 remote control generates the frequencies to test the accuracy of the Eagle 3 Traffic Safety RADAR unit.

The Eagle 3 can use one of two methods to check the accuracy of the unit: 1. Tuning forks or 2. Electronically generated frequencies by means of the remote control.

Procedure:

1. Loosen the screw on the bottom of the remote control.
2. Slide the remote push buttons to expose the interior of the remote control.
3. Once separated, turn the remote control over to expose the circuit board.



Figure 1 – Open Remote Control

4. Connect a frequency counter probe to test point location labeled **TP5** and ground lead of probe to ground of remote control as shown in the image below.
5. Press the switch button shown in diagram and read the frequency displayed on the frequency counter. Depress the button again and the second frequency will appear on the frequency counter. Complete the certificate with that information.

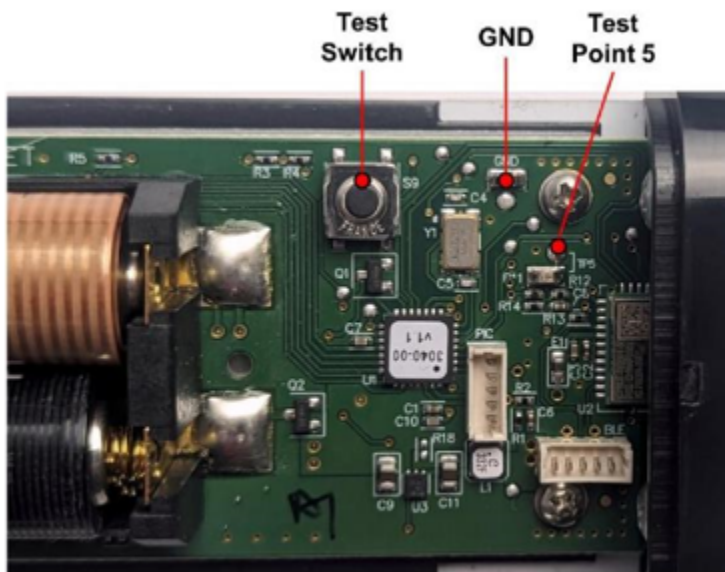


Figure 2 - Remote Control Test Point, GND, and Test Switch Button

Remote Control Frequency Table:

Band	Speed	*Frequency (Hz)
Ka	30 MPH	3208
Ka	35 MPH	3737
Ka	55 MPH	5892
Ka	65 MPH	6961
Ka	45 KPH	2990
Ka	80 KPH	5323

* Tolerance - +/- 5 Hz

* Testing has shown no drift due to temperature

Remote control will present the proper frequencies for the processor that the remote was paired to.

NOTE: The serial number of the remote control is found on the front switch button panel.

NOTE: NO LED operation indicates that the batteries need to be replaced.