REPORT OF FIELD EVALUATION

Client: K 40 Electronics, Inc.
Products Evaluated: K 40 Calibre
Evaluation Criteria: Field Performance
Evaluation Date: 24 October 2005
Evaluation Location: Stan Roberts Senior Road, El Paso, TX
Evaluation Personnel: Carl Fors, SML, Dave Adams E.E., SML, Senior Cpl Mike Brucks, El Paso Police
Report Date/Number: 1 November 2005/SML0511-26

Overview: Bluetooth® wireless communication technology has become an electronics industry standard. Blue tooth® allows dramatic convenience in interfacing a multitude of devices without cumbersome wiring. Bluetooth® has received the blessing of the Federal Communications Commission and has proved to be a stable, reliable communications system. K 40 Electronics has offered remote radar detectors to the 12 Volt automotive aftermarket for decades. The company concentrates on upscale dealers of their products many of them being auto dealers. A remote radar detector is composed of a radar antenna mounted behind the front grill or cowling with a control panel placed inside the vehicle. This control panel contains a speaker alerting the driver to police radar gun use. K 40 has concentrated on custom installations in "high end", "high prestige" vehicles via a miniature blue led warning light usually mounted covertly to the dash board of within the speedometer. K 40's remote Calibre also warns the drivers of impending highway emergencies via two radar based warning systems, i.e. Safety Warning System® and Safety Alert®. Such emergencies are conveyed to the driver either by voice notification or standard band tone warnings on K band alert at 24.100 GHz. The variation from the center frequency of K band as assigned by the Federal Communications Commission is within federal tolerances of +/- 100 MHz from center frequency of K band which is 24.150 GHz.

K40 contacted SML to conduct performance evaluations of their new Calibre remote radar detector. For testing purposes, the radar antenna was mounted outside the vehicle on a testing mounting platform. The shown wire from the antenna is the power wire connected to the vehicle's battery. The antenna communicates to the in-cabin control panel wirelessly via Bluetooth® technology. The product also features a hand held diminutive remote control allowing the driver to select from several warning options including voice notification. The Calibre also offers "front and rear" radar antennas informing the driver of the direction of the radar encounter. As tested only a front antenna was provided by K 40 personnel. Three K 40 personnel attended and observed the field performance evaluation. For further information of specific functions and options of the product see *www.K40.com*. The primary advantage in remote radar detectors is theft prevention as one out of every five dash mounted detectors are stolen each year. Radar detectors are considered a legal product as affirmed by the FCC and the Federal Communications Commission Act as amended. Only Virginia, Washington, D.C. and United States Military Reservations restrict the use of radar detectors in cars. K 40 personnel provided the sample to be tested.

Methodology: As is standard practice with all SML field tests, radar guns and other enforcement equipment are solely operated by radar certified police officers using the devices in accordance with guidelines of the IACP. The police officers also record the results of tested products along with riding in the test vehicle with the representatives of the respective radar detector maker as observers. These "ride along" officers report to the test vehicle the performance of the tested product. This standard practice eliminates any bias.

The K 40 Calibre was not included in SML's Annual Radar Test held in June 2005 at the same location. The product was not available at that time. Consequently, SML conducted the same battery of radar performance testing as the detectors participating in the Annual Radar Test, see *www.speedzones.com*. The temperature during the testing varied from 62° F to 78° F according to National Weather Service Radio. The humidity was 21%. A radio frequency sweep was made of the test course to insure no competing RF signal were present prior to testing.

SML staff member David Adams E.E. accompanied K 40 personnel in the test vehicle to observe and report the results. A certified El Paso Police Department officer operated all radar guns during the testing per the procedures outlined by the IACP. SML staff member Dave Adams observed the installation of the Calibre's antenna as installed by K 40 attendees.

As with the Annual Detector Test orange cones were placed at 2 miles, 1 1/2 mile, 1 mile, and 1/2 mile from the radar gun's location. To be acceptable, a radar detector must alert to the various radar guns at 2 miles giving seven times the warning distance compared to normal targeting range of radar guns. To establish a legal "visual tracking history" for issuance of a speeding violation, officers must be able to identify a suspect vehicle by make and model and then verify their estimated speed using a police radar gun. The accepted distance of beginning such a "visual tracking" history by the officer normally does not exceed 1/4 mile. As with the Annual Test, three police radar bands were used including X band at 10.525 GHz, K band at 24.150 GHz, and Ka band at 34.7 GHz. Radar guns from MPH Industries, Decatur Electronics, and Stalker Radar were used. All radar guns appear on the approved list of the IACP, see *www.iacp.org*. The Calibre was exposed to both instant on and constant on radar gun transmissions. Instant on transmission lasted for two seconds while constant on transmission were ten seconds. Three transmissions of instant on and three transmissions of constant on were made on each radar band at each distance cone or a total of eighteen transmission at each cone. We were looking for correct band identification by the detector. No visual signal strength indicators are present on the Calibre. However, the visual, blue led warning light is calibrated to strobe a proximity warning increasing as it approaches the radar gun source. At the completion of the performance at the 2 mile cone the test vehicle was moved to the 1 1/2 mile cone for an additional 18 encounters. Many competitive detectors had difficulty with band identification and any notification to the driver of radar being used at the 2 mile cone. The Calibre accurately identified and reported radar on all three radar bands at 2 miles as it did at 1 1/2 mile. To be acceptable to SML, any radar detector must identify correctly radar at two miles providing adequate warning time to the driver. This is difficult as the "rule of least squares" meaning the amount of radar signal present at 2 miles is very little exponentially.

The next test was "immediacy of response." This test measures the time it takes for a radar detector to receive and notify the driver compared to the exact transmission time of the radar gun. Radar travels at the speed of light being 186,282.4 miles per second. Forget trying to out run radar! The detector's notification time is directly related to the "sweep rate", sometimes called "scan rate" of the radar detector. SML has measured some detectors taking two seconds to notify the driver from the time of the trigger pull of the radar gun. This is completely unacceptable when we compare the distance traveled at 70 mph. Converting speed to feet per second is interesting in this comparison 70 mph x 1.46=102.2 feet travelled each second. If a detector takes two seconds to receive and warn the driver, the car has traversed 204.4 feet. The normal reaction time of a driver to any highway event is approximately two seconds. Adding the two together we get 408.8 feet before speed can be adjusted. To be acceptable, a radar detector must receive and warn the driver in less than one second. The Calibre was exposed to all radar frequencies five times each during this test with a "immediacy of response" time averaging .08 seconds for all bands. This is less than one second. The Calibre's response time rated with the best dash mount radar detectors as tested at our Annual Test.

Radar Detector Detectors, RDDs, are used to detect radar detector use in 18 wheelers. The use of a radar detector in a commercial vehicle was promulgated in February 1995 by the United States Department of Transportation and restricts the use of radar detectors in commercial vehicles in all states. There are **NO** such restrictions in cars! The RDD test began at the completion of the "immediacy of response" evaluation. The test vehicle containing the Calibre approached the van containing the RDDs from the 1/4 mile cone at 30 mph. Once detected, the driver was told to stop and the detection distance was recorded by the laser

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gun in the range mode. The detection distance was reverified by a second laser reading while the test vehicle was stopped. The Calibre was given five runs at three different RDDs including the VG-2, Spectre II, and Spectre III. The Spectre III was provided by the police officers as they brought it to the test site. The five detection distances were then averaged. If the test vehicle did not stop immediately when told to do so by the van's radio operator, that particular run was cancelled and it was run again. The Calibre was detected by all RDDs at varying distances: VG-2 at 951 feet. Spectre II at 495 feet, and Spectre III at 478 feet. This performance is not uncommon compared to other detectors. In fact, the Calibre's performance against both Spectre RDD rates at the top compared to other premium dash radar detectors.

Conclusions: The field testing confirms the advertising claims of the K 40 Calibre radar detection system. The Calibre is unrivaled in ease of installation using Bluetooth® technology. We found its field performance equal to any premium remote radar detector we have tested using our long standing testing criteria. It detected all police radar guns up to seven times their normal targeting range. It provided solid warnings and performance when confronted by all instant on and constant on radar guns. It provides the performance of a premium dash mounted radar detector while giving the security and convenience of a remotely installed radar detector system.

This evaluation was conducted in accordance with accepted police practices for operation of radar speed measurement devices as outlined by the International Association of Chiefs (IACP) and NHTSA. Police officers observed, reported, and verified the testing procedures.

Attested To This 1st Day of November 2005

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