



## **Tire Track Imprint Evidence**

### **Test No. 23-5351/5 Summary Report**

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Each sample set contained photographs either physically printed (23-5351) or directly downloadable (23-5355) of four questioned tire track imprints, photographs of a suspect tire, and test imprints made with that tire. All participants also had access to an additional set of inked exemplars as a downloadable digital supplemental image set. Participants were requested to compare the imprints from the crime scene with the suspect tire and report their findings. Data was returned by 66 participants: 45 for 23-5351 and 21 for 23-5355 and are compiled into the following tables:

|   | <u>Page</u>               |
|---|---------------------------|
| <u><a href="#">Manufacturer's Information</a></u>   | <u><a href="#">2</a></u>  |
| <u><a href="#">Summary Comments</a></u>             | <u><a href="#">3</a></u>  |
| <u><a href="#">Table 1: Examination Results</a></u> | <u><a href="#">4</a></u>  |
| <u><a href="#">Table 2: Conclusions</a></u>         | <u><a href="#">15</a></u> |
| <u><a href="#">Table 3: Additional Comments</a></u> | <u><a href="#">29</a></u> |
| <u><a href="#">Appendix: Data Sheet</a></u>         |                           |

This report contains the data received from the participants in this test. Since these participants are located in many countries around the world, and it is their option how the samples are to be used (e.g., training exercise, known or blind proficiency testing, research and development of new techniques, etc.), the results compiled in the Summary Report are not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such. The Summary Comments are included for the benefit of participants to assist with maintaining or enhancing the quality of their results. These comments are not intended to reflect the general state of the art within the profession.

Participant results are reported using a randomly assigned "WebCode". This code maintains participant's anonymity, provides linking of the various report sections, and will change with every report.

## Manufacturer's Information

Each sample set contained photographs in either a physically printed format or as a digitally downloadable file. Images consisted of a suspect tire, inked exemplars of a suspect tire, and questioned tire track imprints. Participants also had access to a second set of inked exemplars as a digitally downloadable supplemental file on the CTS Portal. The suspect tire was photographed in segments (K1-K8), with the start and end of each segment indicated by a red line. The inked exemplars were segmented and captured in the same manner. Two photographs contained images of four questioned tire track imprints (Q1-Q4). The suspect tire created all questioned imprints. Participants were requested to compare the imprints from the crime scene with the suspect tire and report their findings.

**SAMPLE PREPARATION:** The previously driven tire used in production of the test was gently cleaned to remove any loose debris from the surface prior to inking.

**KNOWN EXEMPLARS:** Inked exemplar imprints (K1\_Ink-K8\_Ink; K1\_Sup-K8\_Sup) were created by pushing a vehicle equipped with the suspect tire across an inked surface and then white containerboard sheeting. The suspect tire images (K1-K8) were created by removing the tire from the vehicle and photographing in segments after known exemplars and questioned imprints were collected.

**QUESTIONED IMPRINTS:** Questioned imprints (Q1-Q4) were created by pushing a vehicle equipped with the suspect across an inked surface and then the substrate. All production materials were repositioned and the process repeated as necessary to capture all tire track imprints in question.

**VERIFICATION:** Two of the three predistribution laboratories associated all four questioned imprints Q1-Q4 with the suspect tire and reported consistent tire segments. The final predistribution laboratory reported a non-association response for Q1, Q3 and Q4. After further review, it was decided to move forward with the release of the test as is.

**SAMPLE SET ASSEMBLY:** Once sample preparation, verification, and final image production were complete, each photo set was placed into a pre-labeled sample set envelope, sealed, and initialed. A zipped file containing the digitally downloadable media was uploaded to the CTS Portal.

| <b>Imprint</b> | <b>Substrate</b>   | <b>Tire Brand</b> | <b>Tire Spec (DOT Info)</b>           | <b>Segment(s) Associated</b> |
|----------------|--------------------|-------------------|---------------------------------------|------------------------------|
| Q1             | Blue Posterboard   | Ironman GR906     | 205/55R16 91V M+S<br>(DOT 00K JFEAAJ) | K6-K7                        |
| Q2             | Blue Posterboard   | Ironman GR906     | 205/55R16 91V M+S<br>(DOT 00K JFEAAJ) | K2-K3                        |
| Q3             | Piece of Cardboard | Ironman GR906     | 205/55R16 91V M+S<br>(DOT 00K JFEAAJ) | K8-K1                        |
| Q4             | Piece of Cardboard | Ironman GR906     | 205/55R16 91V M+S<br>(DOT 00K JFEAAJ) | K3-K4                        |

## **Summary Comments**

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This test was designed to allow participants to assess their proficiency with tire track imprint examination. Test material consisted of two photographs containing four questioned tire track imprints (Q1-Q4), photographs of the suspect (known) tire, divided into segments (K1-K8), and photographs of inked exemplar imprints made with the tire (K1\_Ink-K8\_Ink). They also received a second set of inked exemplars as a downloadable digital supplemental image set (K1\_Sup-K8\_Sup). Participants were requested to determine if any of the questioned imprints were made by the known tire, using a seven-point conclusion scale. All four of these imprints (Q1, Q2, Q3, Q4) were made by the known tire (Refer to the Manufacturer's Information for preparation details).

For the following statistical tabulations, all responses of association (A-D) with the expected tire segments were tallied together, and all responses of non-association (F-G) were tallied together. All 66 participants (100%) reported the expected associations (conclusions A - D) between the known tire and the four questioned imprints (Q1-Q4.)

# Examination Results

Indicate the results of your comparisons of the suspect tire with the questioned imprints.

TABLE 1a (blue posterboard)

| WebCode-<br>Test | Questioned Imprints |           |            |            |           |            |
|------------------|---------------------|-----------|------------|------------|-----------|------------|
|                  | Conclusion          | <u>Q1</u> | Segment(s) | Conclusion | <u>Q2</u> | Segment(s) |
| 23XGJU-<br>5351  | A                   |           | K6-K7      | A          |           | K3         |
| 2A3YEA-<br>5351  | B                   |           | K6-K7      | A          |           | K3         |
| 2VW9C2-<br>5355  | A                   |           | K6-K7      | A          |           | K3         |
| 3KTA4R-<br>5351  | A                   |           | K6-K7      | A          |           | K3         |
| 4KRWU6-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| 66B2GT-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| 7JQLDR-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| 7PWF8M-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| 97UE9L-<br>5355  | A                   |           | K6-K7      | A          |           | K3         |
| AJYWJL-<br>5351  | B                   |           | K6-K7      | A          |           | K2-K3      |
| APKPVL-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| B4FTDG-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| B9BHUP-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| BLHBL2-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| BVLLRQ-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| CV6RRG-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| DGFC2M-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |

TABLE 1a (blue posterboard)

| WebCode-<br>Test | Questioned Imprints |           |            |            |           |            |
|------------------|---------------------|-----------|------------|------------|-----------|------------|
|                  | Conclusion          | <u>Q1</u> | Segment(s) | Conclusion | <u>Q2</u> | Segment(s) |
| EKU7EY-<br>5351  | A                   |           | K7,K6      | A          |           | K3,K2      |
| EXGBNF-<br>5351  | A                   |           | K6-K7      | A          |           | K3         |
| FDPPJJ-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| FW7VUF-<br>5351  | A                   |           | K6-K7      | A          |           | K3-K2      |
| G6EMXH-<br>5351  | B                   |           | K6-K7      | A          |           | K2-K3      |
| GAAGVJ-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| GVPYZU-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| H3HQLT-<br>5351  | A                   |           | K6-K7      | A          |           | K3         |
| H6APZR-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| H7H3HT-<br>5351  | B                   |           | K6-K7      | B          |           | K2-K3      |
| J23UUU-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| J8BA3H-<br>5351  | A                   |           | 6-7        | A          |           | 2-3        |
| JC3GLQ-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| JJLKT-<br>5355   | A                   |           | K6-K7      | A          |           | K2-K3      |
| K6JEEN-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| K6XZPB-<br>5355  | D                   |           | K6-K7      | B          |           | K2-K3      |
| KVWDXE-<br>5351  | A                   |           | K7         | A          |           | K3         |
| L8LVPP-<br>5351  | A                   |           | K6-K7      | A          |           | K3-K2      |

TABLE 1a (blue posterboard)

| WebCode-<br>Test | Questioned Imprints |           |            |            |           |            |
|------------------|---------------------|-----------|------------|------------|-----------|------------|
|                  | Conclusion          | <u>Q1</u> | Segment(s) | Conclusion | <u>Q2</u> | Segment(s) |
| MD7DKC-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| MKLU DL-<br>5351 | A                   |           | K7         | A          |           | K2-K3      |
| NFRF46-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| NWAFWL-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| PNYEBL-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| PQ6YZ7-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| QGUWE7-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| QWNNXL-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| R3942J-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| RCH9EA-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| RFXZ3G-<br>5351  | A                   |           | K7         | A          |           | K3         |
| T9DZM4-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| TBKHLZ-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| UJ733H-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| UJQKK7-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| UTVRY7-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| V27DLE-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| VHDA8Y-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |

TABLE 1a (blue posterboard)

| WebCode-<br>Test | Questioned Imprints |           |            |            |           |            |
|------------------|---------------------|-----------|------------|------------|-----------|------------|
|                  | Conclusion          | <u>Q1</u> | Segment(s) | Conclusion | <u>Q2</u> | Segment(s) |
| VJLMMF-<br>5355  | A                   |           | K6-K7      | A          |           | K3-K2      |
| W2K2M7-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| WCG6QZ-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| WHNVT7-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| WLLC7Z-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| WQYVMG-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| WU2VPY-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| XFWZ6C-<br>5351  | A                   |           | K7         | A          |           | K3         |
| XKUDR2-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| XPLN2Z-<br>5351  | A                   |           | K6-K7      | A          |           | K2-K3      |
| YR9J2D-<br>5351  | B                   |           | K6-K7      | B          |           | K2-K3      |
| YUE6RY-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |
| ZAZ8MT-<br>5355  | A                   |           | K6-K7      | A          |           | K2-K3      |

| <b>Response Summary</b>   |                   |                                 |                   | <b>Participants: 66</b>   |                   |
|---------------------------|-------------------|---------------------------------|-------------------|---------------------------|-------------------|
| <u>Q1 Conclusion</u>      |                   | <u>Segment(s), by frequency</u> |                   | <u>Q2 Conclusion</u>      |                   |
| Identification (A)        | <b>60</b> (90.9%) | K6-K7                           | <b>60</b> (90.9%) | Identification (A)        | <b>63</b> (95.5%) |
| High Degree of Ass'n. (B) | <b>5</b> (7.6%)   | K7                              | <b>4</b> (6.1%)   | High Degree of Ass'n. (B) | <b>3</b> (4.5%)   |
| Association (C)           | <b>0</b> (0.0%)   |                                 |                   | Association (C)           | <b>0</b> (0.0%)   |
| Limited Ass'n. (D)        | <b>1</b> (1.5%)   |                                 |                   | Limited Ass'n. (D)        | <b>0</b> (0.0%)   |
| Inconclusive (E)          | <b>0</b> (0.0%)   |                                 |                   | Inconclusive (E)          | <b>0</b> (0.0%)   |
| Non-Ass'n. (F)            | <b>0</b> (0.0%)   |                                 |                   | Non-Ass'n. (F)            | <b>0</b> (0.0%)   |
| Exclusion (G)             | <b>0</b> (0.0%)   |                                 |                   | Exclusion (G)             | <b>0</b> (0.0%)   |
|                           |                   | K2-K3                           | <b>51</b> (77.3%) |                           |                   |
|                           |                   | K3                              | <b>10</b> (15.2%) |                           |                   |

Please Note: Only segment(s) reported (format-specific) at a frequency of 5% or greater are tallied in the summary totals.



# Examination Results

Indicate the results of your comparisons of the suspect tire with the questioned imprints.

TABLE 1b (piece of cardboard)

| WebCode-<br>Test | Questioned Imprints |            |            |            |            |            |
|------------------|---------------------|------------|------------|------------|------------|------------|
|                  | Q3                  |            |            | Q4         |            |            |
|                  | Conclusion          | Segment(s) | Conclusion | Segment(s) | Conclusion | Segment(s) |
| 23XGJU-<br>5351  | A                   | K8-K1      | A          | K4         |            |            |
| 2A3YEA-<br>5351  | B                   | K8-K1      | B          | K4         |            |            |
| 2VW9C2-<br>5355  | A                   | K8-K1      | A          | K3-K4      |            |            |
| 3KTA4R-<br>5351  | A                   | K8-K1      | A          | K4         |            |            |
| 4KRWU6-<br>5351  | A                   | K1-K8      | A          | K3-K4      |            |            |
| 66B2GT-<br>5351  | A                   | K8-K1      | B          | K3-K4      |            |            |
| 7JQLDR-<br>5355  | A                   | K8-K1      | A          | K3-K4      |            |            |
| 7PWF8M-<br>5351  | A                   | K8-K1      | A          | K3-K4      |            |            |
| 97UE9L-<br>5355  | A                   | K8-K1      | A          | K4         |            |            |
| AJYWJL-<br>5351  | B                   | K8-K1      | C          | K3-K4      |            |            |
| APKPVL-<br>5351  | A                   | K8-K1      | A          | K3-K4      |            |            |
| B4FTDG-<br>5351  | A                   | K8-K1      | B          | K3-K4      |            |            |
| B9BHUP-<br>5355  | A                   | K8-K1      | A          | K3-K4      |            |            |
| BLHBL2-<br>5351  | A                   | K1-K8      | A          | K4-K3      |            |            |
| BVLLRQ-<br>5351  | A                   | K8-K1      | A          | K3-K4      |            |            |
| CV6RRG-<br>5351  | A                   | K8-K1      | A          | K3-K4      |            |            |
| DGFC2M-<br>5351  | A                   | K8-K1      | A          | K3-K4      |            |            |

TABLE 1b (piece of cardboard)

| WebCode-<br>Test | Questioned Imprints |            |            |            |            |  |
|------------------|---------------------|------------|------------|------------|------------|--|
|                  | Q3                  |            |            | Q4         |            |  |
| Conclusion       | Segment(s)          | Conclusion | Segment(s) | Conclusion | Segment(s) |  |
| EKU7EY-5351      | A                   | K1,K8      | A          | K4,K3      |            |  |
| EXGBNF-5351      | A                   | K8-K1      | A          | K3-K4      |            |  |
| FDPPJJ-5355      | A                   | K8-K1      | A          | K3-K4      |            |  |
| FW7VUF-5351      | A                   | K1-K8      | A          | K4-K3      |            |  |
| G6EMXH-5351      | D                   | K6         | D          | K3-4       |            |  |
| GAAGVJ-5355      | A                   | K8-K1      | A          | K3-K4      |            |  |
| GVPYZU-5351      | A                   | K8-K1      | A          | K3-K4      |            |  |
| H3HQLT-5351      | A                   | K8-K1      | A          | K4         |            |  |
| H6APZR-5355      | A                   | K8-K1      | A          | K3-K4      |            |  |
| H7H3HT-5351      | A                   | K8-K1      | A          | K3-K4      |            |  |
| J23UUU-5351      | A                   | K8-K1      | A          | K4         |            |  |
| J8BA3H-5351      | A                   | 8-1        | A          | 3-4        |            |  |
| JC3GLQ-5351      | A                   | K8-K1      | A          | K3-K4      |            |  |
| JJLKT-5355       | A                   | K8-K1      | A          | K3-K4      |            |  |
| K6JEEN-5351      | A                   | K8-K1      | A          | K3-K4      |            |  |
| K6XZPB-5355      | D                   | K8-K1      | D          | K3-K4      |            |  |
| KVWDXE-5351      | A                   | K1         | C          | K4         |            |  |
| L8LVPP-5351      | A                   | K1-K8      | A          | K4         |            |  |

TABLE 1b (piece of cardboard)

| WebCode-<br>Test | Questioned Imprints |            |            |            |            |            |
|------------------|---------------------|------------|------------|------------|------------|------------|
|                  | <u>Q3</u>           |            |            | <u>Q4</u>  |            |            |
|                  | Conclusion          | Segment(s) | Conclusion | Segment(s) | Conclusion | Segment(s) |
| MD7DKC-5351      | A                   | K8-K1      | B          | K3-K4      |            |            |
| MKLUDL-5351      | A                   | K1         | A          | K4         |            |            |
| NFRF46-5351      | A                   | K8-K1      | A          | K3-K4      |            |            |
| NWAFWL-5355      | A                   | K8-K1      | A          | K3-K4      |            |            |
| PNYEBL-5355      | B                   | K8-K1      | B          | K3-K4      |            |            |
| PQ6YZ7-5355      | A                   | K8-K1      | A          | K3-K4      |            |            |
| QGUWE7-5355      | A                   | K8-K1      | A          | K3-K4      |            |            |
| QWNNXL-5351      | A                   | K1-K8      | A          | K3-K4      |            |            |
| R3942J-5355      | A                   | K1-K8      | A          | K3-K4      |            |            |
| RCH9EA-5355      | A                   | K8-K1      | A          | K3-K4      |            |            |
| RFXZ3G-5351      | A                   | K1         | A          | K3-K4      |            |            |
| T9DZM4-5351      | A                   | K8-K1      | A          | K3-K4      |            |            |
| TBKHLZ-5351      | A                   | K8-K1      | B          | K3-K4      |            |            |
| UJ733H-5351      | A                   | K8-K1      | A          | K3-K4      |            |            |
| UJQKK7-5351      | A                   | K8-K1      | A          | K3-K4      |            |            |
| UTVRY7-5351      | A                   | K8-K1      | A          | K3-K4      |            |            |
| V27DLE-5355      | A                   | K8-K1      | A          | K3-K4      |            |            |
| VHDA8Y-5355      | A                   | K8-K1      | A          | K4         |            |            |

TABLE 1b (piece of cardboard)

| WebCode-<br>Test | Questioned Imprints |            |            |            |            |            |
|------------------|---------------------|------------|------------|------------|------------|------------|
|                  | <u>Q3</u>           |            |            | <u>Q4</u>  |            |            |
|                  | Conclusion          | Segment(s) | Conclusion | Segment(s) | Conclusion | Segment(s) |
| VJLMMF-<br>5355  | A                   | K8-K1      | A          | K4-K3      |            |            |
| W2K2M7-<br>5351  | A                   | K8-K1      | A          | K3-K4      |            |            |
| WCG6QZ-<br>5355  | A                   | K8-K1      | A          | K3-K4      |            |            |
| WHNVT7-<br>5351  | A                   | K1-K8      | A          | K3-K4      |            |            |
| WLLC7Z-<br>5351  | A                   | K8-K1      | B          | K3-K4      |            |            |
| WQYVMG-<br>5351  | A                   | K8-K1      | A          | K3-K4      |            |            |
| WU2VPY-<br>5351  | A                   | K8-K1      | A          | K3-K4      |            |            |
| XFWZ6C-<br>5351  | A                   | K1         | A          | K3-K4      |            |            |
| XKUDR2-<br>5351  | B                   | K8-K1      | B          | K3-K4      |            |            |
| XPLN2Z-<br>5351  | A                   | K8-K1      | B          | K3-K4      |            |            |
| YR9J2D-<br>5351  | B                   | K8-K1      | B          | K3-K4      |            |            |
| YUE6RY-<br>5355  | A                   | K8-K1      | A          | K4         |            |            |
| ZAZ8MT-<br>5355  | A                   | K8-K1      | A          | K3-K4      |            |            |

| <b>Response Summary</b>   |                   |                                 |                   | <b>Participants: 66</b>   |                   |                                 |                   |
|---------------------------|-------------------|---------------------------------|-------------------|---------------------------|-------------------|---------------------------------|-------------------|
| <u>Q3 Conclusion</u>      |                   | <u>Segment(s), by frequency</u> |                   | <u>Q4 Conclusion</u>      |                   | <u>Segment(s), by frequency</u> |                   |
| Identification (A)        | <b>59</b> (89.4%) | K8-K1                           | <b>52</b> (78.8%) | Identification (A)        | <b>52</b> (78.8%) | K3-K4                           | <b>49</b> (74.2%) |
| High Degree of Ass'n. (B) | <b>5</b> (7.6%)   | K1-K8                           | <b>7</b> (10.6%)  | High Degree of Ass'n. (B) | <b>10</b> (15.2%) | K4                              | <b>11</b> (16.7%) |
| Association (C)           | <b>0</b> (0.0%)   | K1                              | <b>4</b> (6.1%)   | Association (C)           | <b>2</b> (3.0%)   |                                 |                   |
| Limited Ass'n. (D)        | <b>2</b> (3.0%)   |                                 |                   | Limited Ass'n. (D)        | <b>2</b> (3.0%)   |                                 |                   |
| Inconclusive (E)          | <b>0</b> (0.0%)   |                                 |                   | Inconclusive (E)          | <b>0</b> (0.0%)   |                                 |                   |
| Non-Ass'n. (F)            | <b>0</b> (0.0%)   |                                 |                   | Non-Ass'n. (F)            | <b>0</b> (0.0%)   |                                 |                   |
| Exclusion (G)             | <b>0</b> (0.0%)   |                                 |                   | Exclusion (G)             | <b>0</b> (0.0%)   |                                 |                   |

Please Note: Only segment(s) reported (format-specific) at a frequency of 5% or greater are tallied in the summary totals.

# Examination Results

## TABLE 1c - Complete Results

| <b>Response Summary</b>                   |                          |   |                          | <b>Participants: 66</b> |
|---|--------------------------|---|--------------------------|-------------------------|
| Q1 Conclusion                             | Segment(s), by frequency | Q2 Conclusion                               | Segment(s), by frequency |                         |
| Identification (A) <b>60</b> (90.9%)      | K6-K7 <b>60</b> (90.9%)  | Identification (A) <b>63</b> (95.5%)        | K2-K3 <b>51</b> (77.3%)  |                         |
| High Degree of Ass'n. (B) <b>5</b> (7.6%) | K7 <b>4</b> (6.1%)       | High Degree of Ass'n. (B) <b>3</b> (4.5%)   | K3 <b>10</b> (15.2%)     |                         |
| Association (C) <b>0</b> (0.0%)           |                          | Association (C) <b>0</b> (0.0%)             |                          |                         |
| Limited Ass'n. (D) <b>1</b> (1.5%)        |                          | Limited Ass'n. (D) <b>0</b> (0.0%)          |                          |                         |
| Inconclusive (E) <b>0</b> (0.0%)          |                          | Inconclusive (E) <b>0</b> (0.0%)            |                          |                         |
| Non-Ass'n. (F) <b>0</b> (0.0%)            |                          | Non-Ass'n. (F) <b>0</b> (0.0%)              |                          |                         |
| Exclusion (G) <b>0</b> (0.0%)             |                          | Exclusion (G) <b>0</b> (0.0%)               |                          |                         |
| Q3 Conclusion                             | Segment(s), by frequency | Q4 Conclusion                               | Segment(s), by frequency |                         |
| Identification (A) <b>59</b> (89.4%)      | K8-K1 <b>52</b> (78.8%)  | Identification (A) <b>52</b> (78.8%)        | K3-K4 <b>49</b> (74.2%)  |                         |
| High Degree of Ass'n. (B) <b>5</b> (7.6%) | K1-K8 <b>7</b> (10.6%)   | High Degree of Ass'n. (B) <b>10</b> (15.2%) | K4 <b>11</b> (16.7%)     |                         |
| Association (C) <b>0</b> (0.0%)           | K1 <b>4</b> (6.1%)       | Association (C) <b>2</b> (3.0%)             |                          |                         |
| Limited Ass'n. (D) <b>2</b> (3.0%)        |                          | Limited Ass'n. (D) <b>2</b> (3.0%)          |                          |                         |
| Inconclusive (E) <b>0</b> (0.0%)          |                          | Inconclusive (E) <b>0</b> (0.0%)            |                          |                         |
| Non-Ass'n. (F) <b>0</b> (0.0%)            |                          | Non-Ass'n. (F) <b>0</b> (0.0%)              |                          |                         |
| Exclusion (G) <b>0</b> (0.0%)             |                          | Exclusion (G) <b>0</b> (0.0%)               |                          |                         |

Please Note: Only segment(s) reported (format-specific) at a frequency of 5% or greater are tallied in the summary totals.

# Conclusions

TABLE 2

| WebCode-Test | Conclusions  |
|--------------|--|
| 23XGJU-5351  | Lucia Forensic 8.10 software and additionally a transparent foil were used in this test. The photographs of a tire (items K1-K8) and their imprints (items K1_ink-K8_ink) were compared with photographs of questioned imprints (items Q1-Q4). It was observed that on the surface of the tire, being the comparative material, there were present some individual identifying characteristics. Similar individual characteristics were also found in the evidence material marked Q1 (segments K6-K7), Q2 (segment K3), Q3 (segments K8-K1) and Q4 (segment K4), and therefore it was assigned a grade A to them.   |
| 2A3YEA-5351  | There was a high degree of association between the questioned impression Q1 and segments K6 and K7 of the "Ironman" tyre. There was correspondence of class characteristics (being design, physical size and general wear) as well as correspondence of randomly acquired characteristics. There was a strong association between questioned impression Q1 and segments K6 and K7 of the "Ironman tyre", however the quality and quantity were insufficient for individualisation. Other items with the same class characteristics are included as possible sources of the impression only if they display the same randomly acquired characteristics and wear observed in questioned impression Q1. Questioned impression Q2 and segment K3 of the "Ironman" tyre share agreement of class and randomly acquired characteristics. This includes agreement of design, physical size, wear and damage (both associated with, and separate to, elements within the design of the tyre). Segment K3 of the "Ironman" tyre was the source of, and made impression Q2, and the likelihood of another item being the source of the impression is considered negligible. There was a high degree of association between the questioned impression Q3 and segments K8 and K1 of the "Ironman" tyre. There was correspondence of class characteristics (being design, physical size and general wear) as well as correspondence of randomly acquired characteristics. There was a strong association between questioned impression Q3 and segments K8 and K1 of the "Ironman tyre", however the quality and quantity were insufficient for individualisation. Other items with the same class characteristics are included as possible sources of the impression only if they display the same randomly acquired characteristics and wear observed in questioned impression Q3. There was a high degree of association between the questioned impression Q4 and segment K4 of the "Ironman" tyre. There was correspondence of class characteristics (being design, physical size and general wear) as well as correspondence of randomly acquired characteristics. There was a strong association between questioned impression Q4 and segments K4 of the "Ironman tyre", however the quality and quantity were insufficient for individualisation. Other items with the same class characteristics are included as possible sources of the impression only if they display the same randomly acquired characteristics and wear observed in questioned impression Q4. |
| 2VW9C2-5355  | Visual examination of the images (Q1-Q4) reveals four questioned tire impressions suitable for comparison. The questioned impressions Q1 , Q2, Q3 and Q4 were visually compared to the recover tire ; the tire was identified as the source of these questioned impressions. The impression in Q1 was made by segment (K6-K7) of the known tire. The impression in Q2 was made by segment (K3) of the known tire. The impression in Q3 was made by segment (K8-K1) of the known tire. The impression in Q4 was made by segment (K3-K4) of the known tire.  |
| 3KTA4R-5351  | 01-01: Photograph of questioned impressions from a blue poster board (Q1-Q2) This photograph depicts a total of two questioned partial tire impression in black material. One of the questioned impressions (Q1) is similar in size, tread design, and at least one randomly acquired characteristic with the suspect's recovered tire (segment K7). It is my opinion that this questioned impression was made by the suspect's tire (Category 1). One of the questioned impressions (Q2) is similar in size, tread design, and at least four randomly acquired characteristics with the suspect's recovered tire (segment K3). It is my opinion that this questioned impression was made by the suspect's tire (Category 1). No further analysis done. 01-02: Photograph of questioned impressions from a piece of cardboard (Q3-Q4) This photograph depicts a total of two questioned partial tire impression in black material. One of the questioned impressions (Q3) is similar in size, tread design, and at least two randomly acquired characteristics with the suspect's recovered tire (segment K1). It is my opinion that this questioned   |

## TABLE 2

| WebCode-Test | Conclusions   |
|--------------|---|
|              | <p>impression was made by the suspect's tire (Category 1). One of the questioned impressions (Q4) is similar in size, tread design, and at least two randomly acquired characteristics with the suspect's recovered tire (segment K4). It is my opinion that this questioned impression was made by the suspect's tire (Category 1). No further analysis done. 01-03: Photographs of the recovered tire (segments) and test impressions (K1-K8 and K1_Ink-K8_Ink) This item was used for comparison purposes. Investigative Leads and Requirements for Further Analysis: If additional trace analysis is necessary, please contact this analyst. Disposition: The evidence will be retained until the laboratory is notified of the disposition.</p>  |
| 4KRWU6-5351  | <p>Exhibits 4.1, 4.2, 5.1, and 5.2 (unknown tire impressions Q1, Q2, Q3 and Q4) were made by the same tire that made exhibit 2, the submitted known tire impressions.</p>   |
| 66B2GT-5351  | <p>The submitted photographs (Item 1A and Item 1B) were examined for questioned tire impressions. Four questioned tire track impressions (designated by the agency as Q1 through Q4) were observed. The questioned tire track impressions Q1-Q4 were visually compared to the submitted known rear passenger tire test impressions (Item 1D) and submitted photographs of the physical known rear passenger tire (Item 1C). Impression Q1 corresponded in tread design, size of tread, noise treatment, and general wear to the submitted known tire. In addition, several voids in the questioned impression corresponded in approximate size, shape, position, and orientation to randomly acquired characteristics in the known tire. In the opinion of the examiner, the submitted known tire made Impression Q1 (Identification; see Association Scale below). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Impression Q2 corresponded in tread design, size of tread, noise treatment, and general wear to the submitted known tire. In addition, several voids in the questioned impression corresponded in approximate size, shape, position, and orientation to randomly acquired characteristics in the known tire. In the opinion of the examiner, the submitted known tire made Impression Q2 (Identification; see Association Scale below). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Impression Q3 corresponded in tread design, size of tread, noise treatment, and general wear to the submitted known tire. In addition, several voids in the questioned impression corresponded in approximate size, shape, position, and orientation to randomly acquired characteristics in the known tire. In the opinion of the examiner, the submitted known tire made Impression Q3 (Identification; see Association Scale below). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Impression Q4 corresponded in tread design, size of tread, noise treatment, and general wear to the submitted known tire. In addition, several void areas in the impression corresponded in approximate size, shape, position, and orientation to randomly acquired characteristics on the submitted known tire. In the opinion of the examiner, Impression Q4 was made either by this tire or by another tire with corresponding class characteristics, wear, and randomly acquired characteristics as observed in the questioned impression (High degree of association; see Association Scale below). The corresponding wear and randomly acquired characteristics indicate a strong association; however, the quality and/or quantity were insufficient for an identification.</p> |
| 7JQLDR-5355  | <p>Results/Opinions and Interpretations: Two tire impressions (Q1 and Q2) suitable for comparison were located on a photographed blue piece of poster board. Two tire impressions (Q3 and Q4) suitable for comparison were located on a photographed piece of cardboard. Eight segments of one known tire were photographed and inked and submitted as known items K1 through K8. The questioned impressions were compared to the eight segments of the known tire. An overlapping area of known tire segments K6 through K7 was identified as the source of impression Q1. This area of the known tire and impression Q1 correspond in design, noise pattern, wear, and randomly acquired characteristics in sufficient quality and quantity to conclude that the known tire made impression Q1. An overlapping area of known tire segments K2 through K3 was identified as the source of impression Q2. This area of the known tire and impression Q2 correspond in design, noise pattern, wear, and randomly acquired characteristics in sufficient quality and quantity to conclude that the known tire made impression Q2. An overlapping area of known tire segments K8 through K1 was identified as the source of impression Q3. This area of the known tire and impression Q3 correspond in design, noise pattern, wear, and randomly acquired</p>  |



## TABLE 2

| WebCode-Test | Conclusions  |
|--------------|--|
|              | <p>characteristics in sufficient quality and quantity to conclude that the known tire made impression Q3. An overlapping area of known tire segments K3 through K4 was identified as the source of impression Q4. This area of the known tire and impression Q4 correspond in design, noise pattern, wear, and randomly acquired characteristics in sufficient quality and quantity to conclude that the known tire made impression Q4. REMARKS The following conclusion scale descriptions are meant to provide context to the levels of opinions reached in this report. Identification: The highest degree of association. The questioned impression and the known surface share agreement of class and randomly acquired characteristics of sufficient quality and quantity to conclude that the known footwear or tire is the source of the questioned impression. High degree of association: The questioned impression and known surface correspond in the class characteristics of design, physical size, and general wear. There are additional individualizing characteristics; however, the conclusion is limited. The known shoe or tire probably made the impression, but this conclusion doesn't reach the level of a definitive identification. Other footwear or tires with the same class characteristics observed in the impression are included in the population of possible sources only if they display the same wear and/or randomly acquired characteristics observed in the questioned impression. Association of class characteristics: The questioned impression and known surface correspond in class characteristics of both design and physical size. Correspondence of general wear may also be present. The known footwear or tire is a possible source of the questioned impression and therefore could have produced the impression. Other footwear or tires with the same class characteristics observed in the impression are included in the population of possible sources. Limited association of class characteristics: The questioned impression and known surface may correspond in some class characteristics: design, shape, physical size, general wear; however, there were significant limiting factors that do not permit a stronger association between the questioned impression and known surface. No confirmable differences were observed that could exclude the footwear or tire. The known footwear or tire is a possible source of the questioned impression and therefore could have produced the impression. Other footwear or tires with the same class characteristics observed in the impression are included in the population of possible sources. Indications of non-association: The questioned impression exhibits dissimilarities when compared to the known surface; however, the details or features were not sufficiently clear to permit an exclusion. Exclusion: The highest degree of non-association. Sufficient differences were noted in the comparison of class and/or randomly acquired characteristics between the questioned impression and the known surface. The known shoe or tire was not the source of, and did not make, the questioned impression. Lacks sufficient detail - Inconclusive: A comparison was conducted, however there is insufficient detail in the questioned impression for a meaningful conclusion.</p> |
| 7PWF8M-5351  | <p>Questioned impression Q1 is a partial tire impression on blue poster board. Q1 was made by the known tire. Questioned impression Q2 is a tire impression on blue poster board. Q2 was made by the known tire. Questioned impression Q3 is a tire impression on cardboard. Q3 was made by the known tire. Questioned impression Q4 is a tire impression on cardboard. Q4 was made by the known tire. Tire impression analysis is based on the comparison of class and randomly acquired characteristics. Corresponding class and randomly acquired characteristics support the conclusion that the tire was the source of, and made, the questioned impression. Currently, the possibility that other tires having the same class and randomly acquired characteristics cannot be statistically calculated.</p>  |
| 97UE9L-5355  | <p>The Q1TT1 impression was made by Items K6-K7 based on sufficient agreement of observable class and randomly acquired characteristics. Sufficient differences were noted between the characteristics present in the Q1TT1 impression and those present on Items K1-K5 and K8 to conclude that the impression was not made by Items K1-K5 and K8. The Q2TT1 impression was made by Item K3 based on sufficient agreement of observable class and randomly acquired characteristics. Sufficient differences were noted between the characteristics present in the Q2TT1 impression and those present on Items K1-K2 and K4-K8 to conclude that the impression was not made by Items K1-K2 and K4-K8. The Q3TT1 impression was made by Items K8-K1 based on sufficient agreement of observable class and randomly acquired characteristics. Sufficient differences were noted between the characteristics present in the Q3TT1 impression and those present on Items K2-K7 to conclude that the impression was not made by Items K2-K7. The Q4TT1 impression was made by Item K4 based on sufficient agreement of observable class and randomly acquired characteristics. Sufficient differences were noted between the characteristics</p>   |

## TABLE 2

| WebCode-Test | Conclusions  |
|--------------|--|
| AJYWJL-5351  | <p>present in the Q4TT1 impression and those present on Items K1-K3 and K5-K8 to conclude that the impression was not made by Items K1-K3 and K5-K8.</p> <p>ITEMS: 1 a sealed manila envelope identified as "TEST NO. 23-5351: TIRE TRACK IMPRINT EVIDENCE" containing: 1-1 photographs of known tires identified as "Item K1-Item K8" 1-2 photographs of known tires inked identified as "Item K1_ink-Item K8_ink" 1-3 photograph of questioned impressions 1-3-1 questioned impression Q1 1-3-2 questioned impression Q2 1-4 photograph of questioned impressions 1-4-1 questioned impression Q3 1-4-2 questioned impression Q4 RESULTS: Items #1-3-1, #1-3-2, #1-4-1, and #1-4-2 were examined visually and compared to item #1-2. The design characteristics, physical size, and randomly acquired characteristics of the questioned impression Q1, item #1-3-1, were found to correspond to the known tire, item #1-2, segments K6-K7. The design characteristics, physical size, and randomly acquired characteristics of the questioned impression Q2, item #1-3-2, were found to correspond to the known tire, item #1-2, segments K2-K3. The design characteristics, physical size, and randomly acquired characteristics of the questioned impression Q3, item #1-4-1, were found to correspond to the known tire, item #1-2, segments K8-K1. The design characteristics and physical size of the questioned impression Q4, item #1-4-2, were found to correspond to the known tire, item #1-2, segments K3-K4. Few randomly acquired characteristics were found. OPINION: The Q1 impression, item #1-3-1, was very likely to have been made by the tire, item #1-2. This is a High Degree of Association. Please see Association Key below. These associations are significant enough to determine that the known tire, item #1-2, was the source of the Q2 impression, item #1-3-2. This is an Identification. Please see Association Key below. The Q3 impression, item #1-4-1, was very likely to have been made by the tire, item #1-2. This is a High Degree of Association. Please see Association Key below. The tire, item #1-2, is a possible source of the Q4 impression, item #1-4-2. This is an Association of Class Characteristics. Please see Association Key below. NOTE: Class characteristics can include outsole design, physical size, areas of wear, and/or texturing.</p> |
| APKPVL-5351  | <p>The Items Q1, Q2, Q3, and Q4 questioned tire impressions were all made by the submitted known tire. These identifications are based on sufficient agreement of the combination of individual characteristics (randomly acquired characteristics) and all discernible class characteristics.</p>   |
| B4FTDG-5351  | <p>Four (4) questioned, partial tire impressions, previously marked Q1 through Q4, were found on two (2) photographs in Submission 001. The questioned, partial tire impressions, Q1 through Q4, have been compared with the pictures of the known tire segments and known tire test impressions found in Submission 001. The questioned, partial tire impression, Q1, has been identified within segments K6 through K7 of the known tire test impressions and was made by this tire. The questioned, partial tire impression, Q2, has been identified within segments K2 through K3 of the known tire test impressions and was made by this tire. The questioned, partial tire impression, Q3, has been identified within segments K8 through K1 of the known tire test impressions and was made by this tire. The questioned, partial tire impression, Q4, corresponds in physical size, shape, tread design, general wear and some individual characteristics within segments K3 through K4 of the known tire test impressions and was probably made by this tire. The possibility exists that another tire of the same physical size, shape, tread design, general wear, and with individual characteristics of the same type and in the same location made this impression.</p>  |
| B9BHUP-5355  | <p>A tire tread impression examination and comparison were completed between the question (unknown) (Q1-Q4) tire tread impressions and the known tire tread exemplars (K1-K8) provided. The following results were concluded: Question impression Q1 was compared and identified to known exemplars K6-K7, the question impression and known exemplars correspond in tread design, noise pattern, and have multiple randomly acquired characteristics in common. Question impression Q2 was compared and identified to known exemplars K2-K3, the question impression and known exemplars correspond in tread design, noise pattern, and have multiple randomly acquired characteristics in common. Question impression Q3 was compared and identified to known exemplars K8-K1, the question impression and known exemplars correspond in tread design, noise pattern, and have multiple randomly acquired characteristics in common. Question impression Q4 was compared and identified to known exemplars</p>   |

TABLE 2

| WebCode-Test | Conclusions   |
|--------------|---|
|              | K3-K4, the questioned impression and known exemplars correspond in tread design, noise pattern, and have multiple randomly acquired characteristics in common.  |
| BLHBL2-5351  | One partial tire impression (Q1) and three tire impressions (Q2 through Q4) were depicted in the photographs of impressions from the residence which are similar in class characteristics (size, tread design) and wear to the known tire from the suspect vehicle (Item K). Additionally, these impressions share randomly acquired characteristics to the known tire from the suspect vehicle. It is our opinion that these impressions were made by the known tire from the suspect vehicle (Item K).  |
| BVLLRQ-5351  | The Q1 through Q4 tire impressions correspond with the recovered tire in tread design, physical size, wear (both general and specific), and randomly acquired characteristics. Therefore, this tire was identified as the source of these impressions.  |
| CV6RRG-5351  | Impressions Q1 - Q4 and the known tire share agreement of tire tread design, dimension (pitch sequence) wear, and randomly acquired characteristics of sufficient quality and quantity. Therefore, the known tire made impressions Q1 - Q4. Tire impressions analysis is based on the comparison of class and randomly acquired characteristics. Corresponding class and randomly acquired characteristics support the conclusion that the tire was the source of, and made, the questioned impression. Currently, the possibility that other tires having the same class and randomly acquired characteristics cannot be statistically calculated.   |
| DGFC2M-5351  | Q1 shows agreement in pattern, size, pitch sequence, degree of wear and fine detail with section K6-K7. Q2 shows agreement in pattern, size, pitch sequence, degree of wear and fine detail with section K2-K3. Q3 shows agreement in pattern, size, pitch sequence, degree of wear and fine detail with section K8-K1. Q4 shows agreement in pattern, size, pitch sequence, degree of wear and fine detail with section K3-K4. The suspect tyre is responsible for each of these marks   |
| EKU7EY-5351  | Comparative analysis between the Q1 impression and the submitted test tire impressions revealed correspondence of class characteristics (pattern and general condition of wear), and multiple randomly acquired characteristics. It was concluded that the submitted tire, specifically sections K7 and K6, was the source of, and made, the Q1 impression. Another tire being the source of the impression is considered a practical impossibility. Comparative analysis between the Q2 impression and the submitted test tire impressions revealed correspondence of class characteristics (pattern, physical size, and general condition of wear), and multiple randomly acquired characteristics. It was concluded that the submitted tire, specifically sections K3 and K2, was the source of, and made, the Q2 impression. Another tire being the source of the impression is considered a practical impossibility. Comparative analysis between the Q3 impression and the submitted test tire impressions revealed correspondence of class characteristics (pattern, physical size, and general condition of wear), and multiple randomly acquired characteristics. It was concluded that the submitted tire, specifically sections K1 and K8, was the source of, and made, the Q3 impression. Another tire being the source of the impression is considered a practical impossibility. Comparative analysis between the Q4 impression and the submitted test tire impressions revealed correspondence of class characteristics (pattern, physical size, and general condition of wear), and multiple randomly acquired characteristics. It was concluded that the submitted tire, specifically sections K4 and K3, was the source of, and made, the Q4 impression. Another tire being the source of the impression is considered a practical impossibility. |
| EXGBNF-5351  | Comparison of the questioned impressions (Q1-Q4) against the known tire exemplars (K1-K8) reveals similarities in tread design, noise treatment sequence, wear, and randomly acquired characteristics. In the opinion of the examiner, the particular known tire was the source of, and made, the questioned impressions.   |
| FDPPJJ-5355  | Based on a correspondence of tread design, size, noise treatment, wear, and randomly acquired characteristics, the recovered tire made all four of the impressions (Items Q1 – Q4).   |

TABLE 2

| WebCode-Test | Conclusions   |
|--------------|---|
| FW7VUF-5351  | The questioned tire impressions (Q1 - Q4) are similar in design, dimensions and wear to the known tire exemplars and images of the known tire (K1 - K8). The questioned tire impressions also exhibit randomly acquired characteristics in common with the known tire exemplars and images.   |
| G6EMXH-5351  | The fragment of the tire track imprint found at the crime scene (Q1), presents physical characteristics of design, dimensions, damage and wear, similar to the photographs of the tire segments of the suspect vehicle and identified as (k6- k7) and the printouts of the images made with the recovered tire (k2_ink-k3_ink); Therefore, it is concluded that Q1 could have been produced by the segments identified as k6-k7, taken from the tire of the suspect vehicle. The tire track imprint, found at the crime scene identified as (Q2), presents physical characteristics of design, dimensions, wear, damage and imperfections, similar to the photographs of the tire segments of the suspect vehicle and identified as (k2- k3) and the images imprints made with the recovered tire (k2_ink-k3_ink), it is concluded that the fragment Q2 has been produced by the tire segments identified as K2-K3, taken from the tire of the suspect vehicle. The fragment of the tire track imprint found at the crime scene identified as Q3 not superimposed, presents physical characteristics of design, dimensions, and damage similar to the photographs of the tire segments of the suspect vehicle and identified as K6 and of the impressions of the images made with the recovered tire (k6_ink), it is concluded that it could have been produced by the segment of the rim identified as K6, taken from the rim of the suspect vehicle. The fragment of the tire track imprint found at the crime scene identified as Q4 not superimposed, presents physical characteristics of design, dimensions, and damage similar to the photographs of the tire segments of the suspect vehicle and identified as (K3-K4) and of the impressions of the images made with the recovered tire (k3_ink-k4_ink), it is concluded that it could have been produced by the segment of the rim identified as K6, taken from the rim of the suspect vehicle. The fragments of the tire track imprint found at the crime scene Q3 and Q4, have similar physical characteristics of design, size, dimensions, but with limiting identification factors.      |
| GAAGVJ-5355  | A tire track comparison was conducted with the following results: Impression Q1 was compared and identified as being produced by sections K6-K7 of the known tire. Impression Q1 was compared and identified as being produced by sections K2-K3 of the known tire. Impression Q1 was compared and identified as being produced by sections K8-K1 of the known tire. Impression Q1 was compared and identified as being produced by sections K3-K4 of the known tire.   |
| GVPYZU-5351  | The Items Q1 through Q4 questioned tire impressions were analyzed, compared and evaluated with the Items K1 through K8 segments of the known Ironman tire. The Item Q1 questioned tire impression corresponds in tread design, physical size, general wear and five (5) randomly acquired characteristics with the Item K6-K7 segments of the known Ironman tire. The Item Q2 questioned tire impression corresponds in tread design, physical size, general wear and four (4) randomly acquired characteristics with the Item K2-K3 segments of the known Ironman tire. The Item Q3 questioned tire impression corresponds in tread design, physical size, general wear and five (5) randomly acquired characteristics with the Item K8-K1 segments of the known Ironman tire. The Item Q4 questioned tire impression corresponds in tread design, physical size, general wear and five (5) randomly acquired characteristics with the Item K3-K4 segments of the known Ironman tire. Based upon the above factors, it is the opinion of this examiner that: The Item K6-K7 segments of the Ironman known tire was the source of, and made, the Item Q1 questioned tire impression resulting in an identification. Another tire being the source of the impression is considered a practical impossibility. The Item K2-K3 segments of the Ironman known tire was the source of, and made, the Item Q2 questioned tire impression resulting in an identification. Another tire being the source of the impression is considered a practical impossibility. The Item K8-K1 segments of the Ironman known tire was the source of, and made, the Item Q3 questioned tire impression resulting in an identification. Another tire being the source of the impression is considered a practical impossibility. The Item K3-K4 segments of the Ironman known tire was the source of, and made, the Item Q4 questioned tire impression resulting in an identification. Another tire being the source of the impression is considered a practical impossibility. All conclusions listed herein have been verified by a second qualified latent print examiner. |

## TABLE 2

| WebCode-Test | Conclusions  |
|--------------|--|
| H3HQLT-5351  | <p>Item 01-01: This photograph depicts a total of two questioned tire impressions. The photograph was scanned into a digital format and further processed. The questioned impressions (Q1 and Q2) are a partial tire impression and a complete tire impression, respectively. The questioned impressions are similar in size, shape, and tread design to the suspect tire (01-03). In addition, there is at least one randomly acquired characteristic visible in each of the questioned impressions and on tread of the tire. It is my opinion that these questioned impressions were made by the suspect tire (Category 1). Item 01-02: This photograph depicts a total of two questioned tire impressions. The photograph was scanned into a digital format and further processed. The questioned impressions (Q3 and Q4) are overlapping complete tire impressions. The questioned impressions are similar in size, shape, and tread design to the suspect tire (01-03). In addition, there are least two randomly acquired characteristics visible in each of the questioned impressions and on tread of the tire. It is my opinion that these questioned impressions were made by the suspect tire (Category 1). Item 01-03: This item was used for comparison purposes.</p>   |
| H6APZR-5355  | <p>Known Tire #1 (segments K6-K7) was identified as the source of tire impression Q1. Known Tire #1 (segments K2-K3) was identified as the source of tire impression Q2. Known Tire #1 (segments K8-K1) was identified as the source of tire impression Q3. Known Tire #1 (segments K3-K4) was identified as the source of tire impression Q4.</p>   |
| H7H3HT-5351  | <p>Q1 is similar in size, shape, tread design, wear, and shares at least two randomly acquired characteristics to the known tire. It is my opinion that Q1 was made by the known tire. Q2 is similar in size, shape, tread design, wear, and shares at least four randomly acquired characteristics to the known tire. It is my opinion that Q2 was made by the known tire. Q3 is similar in size, shape, tread design, wear, and shares at least two randomly acquired characteristics to the known tire. It is my opinion that Q3 was made by the known tire. Q4 is similar in size, shape, tread design, wear, and shares at least three randomly acquired characteristics to the known tire. It is my opinion that Q4 was made by the known tire. The photographs of the known tire and the photographs of test impressions from the known tire were used for comparison purposes.</p>   |
| J23UUU-5351  | <p>Exhibits 1 - 4 contained images of four questioned impressions, Q1-Q4. The questioned impressions were compared to Exhibit 5 (photographs of the known tire (K1-K8)), Exhibit 6 (photographs of the known imprints (K1_Ink – K8_Ink), and Exhibit 7 (digital images of known imprints (K1_Sup – K8_Sup)) said to be from the recovered tire. A complete evaluation of a questioned impression and a known tire includes looking at correspondence in tread design, physical size and shape of design present, wear characteristics, and any distinctive characteristics randomly acquired on the tread of the known tire that are represented in the questioned impression. The questioned impression in Exhibit 1 (Q1) corresponded in physical shape, tread design, noise treatment, wear and randomly acquired characteristics to the known tire segments K6 and K7. Therefore, the known tire represented in Exhibits 5 – 7 is the source of the questioned tire impression in Q1 (Source Identification). The questioned impression in Exhibit 2 (Q2) corresponded in physical shape, tread design, noise treatment, wear and randomly acquired characteristics to the known tire segments K2 and K3. Therefore, the known tire represented in Exhibits 5 – 7 is the source of the questioned tire impression in Q2 (Source Identification). The questioned impression in Exhibit 3 (Q3) corresponded in physical shape, tread design, noise treatment, wear and randomly acquired characteristics to the known tire segments K1 and K8. Therefore, the known tire represented in Exhibits 5 – 7 is the source of the questioned tire impression in Q3 (Source Identification). The questioned impression in Exhibit 4 (Q4) corresponded in physical shape, tread design, noise treatment, wear and randomly acquired characteristics to the known tire segment K4. Therefore, the known tire represented in Exhibits 5 – 7 is the source of the questioned tire impression in Q4 (Source Identification).</p> |
| J8BA3H-5351  | <p>The Q1 tire impression corresponds to the tire, segments K6-K7, in tread design, physical size, wear (general and specific) and randomly acquired characteristics. Therefore, this section of tire was identified as the source of this impression. The Q2 tire impression corresponds to the tire, segments K2-K3, in tread design, physical size, wear (general and specific) and randomly acquired characteristics. Therefore,</p>   |

## TABLE 2

| WebCode-Test | Conclusions  |
|--------------|--|
|              | <p>this section of tire was identified as the source of this impression. The Q3 tire impression corresponds to the tire, segments K8-K1, in tread design, physical size, wear (general and specific) and randomly acquired characteristics. Therefore, this section of tire was identified as the source of this impression. The Q4 tire impression corresponds to the tire, segments K3-K4, in tread design, physical size, wear (general and specific) and randomly acquired characteristics. Therefore, this section of tire was identified as the source of this impression.</p>   |
| JC3GLQ-5351  | <p>I compared Items 001-Q1 through 001-Q4 to each of the photographs of the known impressions made with the recovered tire (Items 001-K1_ink through 001- K8_ink) and the photographs of the tire itself (Items 001-K1 through 001-K8). The questioned impressions and the recovered tire share agreement of class and randomly acquired characteristics of sufficient quality and quantity for identification. The submitted tire was the source of, and made, the questioned impressions 001-Q1 through 001-Q4. Another tire being the source of the impression is considered a practical impossibility. The following segments of the tire were identified as being responsible for making the questioned impressions: Item 001-Q1 with K6 and K7 Item 001-Q2 with K2 and K3 Item 001-Q3 with K8 and K1 Item 001-Q4 with K3 and K4</p>  |
| JLLKTT-5355  | <p>Based on examination of Q1-Q4 imprints and examination and comparison with photographs (K1 – K8) of the tire and known imprints (K1_Ink – K8_Ink) made with the tire, the following conclusions were reached: The Q1-Q4 imprints correspond with the respective portions of the known tire in physical size and design, general condition of wear, specific location of wear, and a number of randomly acquired characteristics. Therefore, the known tire is identified as the source of the Q1-Q4 imprints.</p>   |
| K6JEEN-5351  | <p>It is the opinion of the undersigned examiners that the questioned tire track impression, Q1, in submission 001-1 corresponds in physical size, tread design, wear characteristics, and randomly acquired characteristics with segment K6-K7 in the known tire in submission 001. This opinion is the highest degree of association that can be expressed in this type of comparison. It is the opinion of the undersigned examiners that the questioned tire track impression, Q2, in submission 001-1 corresponds in physical size, tread design, wear characteristics, and randomly acquired characteristics with segment K2-K3 in the known tire in submission 001. This opinion is the highest degree of association that can be expressed in this type of comparison. It is the opinion of the undersigned examiners that the questioned tire track impression, Q3, in submission 001-2 corresponds in physical size, tread design, wear characteristics, and randomly acquired characteristics with segment K8-K1 in the known tire in submission 001. This opinion is the highest degree of association that can be expressed in this type of comparison. It is the opinion of the undersigned examiners that the questioned tire track impression, Q4, in submission 001-2 corresponds in physical size, tread design, wear characteristics, and randomly acquired characteristics with segment K3-K4 in the known tire in submission 001. This opinion is the highest degree of association that can be expressed in this type of comparison.</p> |
| K6XZPB-5355  | <p>First of all, the imprints are in 2D, measurement of the depth of the sculptures is impossible, excluding identification to the highest degree of association. ITEM Q1 This tire print corresponds to the K6-K7 segments, some similar class characteristics between the questioned and known item with limiting factor (Partial print). ITEM Q2 This tire print corresponds to the K2-K3 segments, both in terms of class and acquired characteristics. ITEM Q3 This tire print corresponds to the K8-K1 segments some similar class characteristics between the questioned and known item with limiting factor (Partially hidden print). ITEM Q4 This tire print corresponds to the K3-K4 segments, some similar class characteristics between the questioned and known item with limiting factor (Partially hidden print).</p>   |
| KVWDXE-5351  | <p>Items Submitted: Items K1 – K8: Photographs of the recovered tire (segments), lighted from above. Items K1 Ink – K8 Ink: Photographs of known imprints made with the recovered tire (segments). Items K1 Sup – K8 Sup: Digital supplemental images of known imprints made with the recovered tire (segments). Item Q1: Photograph of questioned imprint found on blue posterboard. Item Q2: Photograph of questioned imprint found on blue posterboard. Item Q3: Photograph of questioned imprint found on a piece of cardboard. Item Q4: Photograph of questioned imprint found on a piece of cardboard. Examination:</p>  |

## TABLE 2

| WebCode-Test | Conclusions  |
|--------------|--|
|              | <p>The questioned imprint labeled Q1 and the known tire segment labeled K7, share agreement of class, wear and randomly acquired characteristics of sufficient quality and quantity. It is the opinion of this examiner, that Q1 was made by the known tire segment labeled K7. The questioned imprint labeled Q2 and the known tire segment labeled K3, share agreement of class, wear and randomly acquired characteristics of sufficient quality and quantity. It is the opinion of this examiner, that Q3 was made by the known tire segment labeled K3. The questioned imprint labeled Q3 and the known tire segment labeled K1, share agreement of class, wear and randomly acquired characteristics of sufficient quality and quantity. It is the opinion of this examiner, that Q3 was made by the known tire segment labeled K1. The questioned imprint labeled Q4 shares some general class characteristics as the known tire segment labeled K4. There were two overlapping tire imprints on this paper which caused issues with clarity and hindered the evaluation. The noise treatment corresponds as does the wear pattern between the questioned imprint Q4 and the submitted tire segment labeled K4, however there were no randomly acquire characteristics visible. It is the opinion of this examiner, that the known tire segment labeled K4 and any other tire with the same general class characteristics could have been the source of the questioned imprint labeled Q4. The tire could neither be eliminated nor identified.</p>   |
| L8LVPP-5351  | <p>The submitted photographs were examined and found to contain four (4) questioned tire track impressions of value for comparison. The known tire in exhibit TIEP made, and is the source of, the questioned tire impressions Q1 through Q4. These identifications are based on agreement of class characteristics and randomly acquired characteristics. Another tire being the source of the questioned impressions is considered a practical impossibility.</p>  |
| MD7DKC-5351  | <p>The imprints Q1, Q2 and Q3 are associated with the respective segments as written in the table due to shared class characteristics and sufficient randomly aquired characteristics of very high quality and quantity. The imprint Q4 was associated with the respective segments as written in the table due to shared class characteristics and some randomly aquired characteristics.</p>   |
| MKLUDL-5351  | <p>Exhibits 4.1, 4.2, 5.1, and 5.2 (questioned tire impressions Q1 through Q4) were made by the tire that made exhibit 2, the submitted known impressions.</p>   |
| NFRF46-5351  | <p>Questioned impression Q1-Q4 were compared to know impression K1-K8. Q1 was identified to segments K6-K-7. Q2 was identified to segments K2-K3. Q3 was identified to segments K8-K1. Q4 was identified to segments K3-K4. All based on the randomly acquired characteristics and unique wear found throughout the impressions.</p>   |
| NWAFWL-5355  | <p>Manufactured pattern impressions, that appear to be of tire origin, suitable for comparative examination were noted in Exhibits Q1-Q2 and Q3-Q4. One (1) manufactured pattern impressions noted in Exhibit Q1-Q2 (photograph marker Q1) was made by the tire depicted in Exhibits K6 and K7, K6_ink and K7_ink and K6_sup and K7_sup based on design, physical size, noise treatment, wear and randomly acquired characteristics. This opinion means that the observed class characteristics and randomly acquired characteristics correspond and the examiner would not expect to see the same agreement of features repeated in an impression that came from a different source. One (1) manufactured pattern impressions noted in Exhibit Q1-Q2 (photograph marker Q2) was made by the tire depicted in Exhibits K2 and K3, K2_ink and K3_ink and K2_sup and K3_sup based on design, physical size, noise treatment, wear and randomly acquired characteristics. This opinion means that the observed class characteristics and randomly acquired characteristics correspond and the examiner would not expect to see the same agreement of features repeated in an impression that came from a different source. One (1) manufactured pattern impressions noted in Exhibit Q3-Q4 (photograph marker Q3) was made by the tire depicted in Exhibits K1 and K8, K1_ink and K8_ink and K1_sup and K8_sup based on design, physical size, noise treatment, wear and randomly acquired characteristics. This opinion means that the observed class characteristics and randomly acquired characteristics correspond and the examiner would not expect to see the same agreement of features repeated in an impression that came from a different source. One (1) manufactured pattern impressions noted in Exhibit Q3-Q4 (photograph marker Q4) was made by the tire depicted in Exhibits K3 and K4, K3_ink and K4_ink and K3_sup and K4_sup based on</p> |

## TABLE 2

| WebCode-Test | Conclusions  |
|--------------|--|
| PNYEBL-5355  | design, physical size, noise treatment, wear and randomly acquired characteristics. This opinion means that the observed class characteristics and randomly acquired characteristics correspond and the examiner would not expect to see the same agreement of features repeated in an impression that came from a different source.   |
| PNYEBL-5355  | The K6 and K7 known tire segments were identified as being the source of and made the Q1 questioned impression. The known tire segments and the Q1 questioned impression corresponded in design, physical size, specific degree of wear, and randomly acquired characteristics of sufficient quality and quantity. Another tire being the source of the impression is considered a practical impossibility. The K2 and K3 known tire segments were identified as being the source of and made the Q2 questioned impression. The known tire segments and the Q2 questioned impression corresponded in design, physical size, specific degree of wear, and randomly acquired characteristics of sufficient quality and quantity. Another tire being the source of the impression is considered a practical impossibility. There was a high degree of association between the Q3 questioned impression and known tire segments K8 and K1. The known tire segments corresponded in design, physical size, and specific degree of wear. They also corresponded in randomly acquired characteristics of sufficient quality. The characteristics observed exhibited strong associations between the K8 and K1 known tire segments and Q3 questioned impression; however, the quantity was insufficient for an identification. Other tires with the same class characteristics observed in the impression are included in the population of possible sources only if they display the same wear and/or randomly acquired characteristics observed in the question impression. There was a high degree of association between the Q4 questioned impression and known tire segments K3 and K4. The known tire segments corresponded in design, physical size, and specific degree of wear. They also corresponded in randomly acquired characteristics of sufficient quality. The characteristics observed exhibited strong associations between the K3 and K4 known tire segments and Q4 questioned impression; however, the quantity was insufficient for identification. Other tires with the same class characteristics observed in the impression are included in the population of possible sources only if they display the same wear and/or randomly acquired characteristics observed in the question impression. |
| PQ6YZ7-5355  | It was determined utilizing side by side and overlay techniques of comparison that the questioned partial tiretrack impressions Q1, Q2, Q3 and Q4 were positively made by the known tire.  |
| QGUWE7-5355  | The questioned imprints were compared to the imprints of the recovered tire. Every item Q1 to Q4 shared enough details and individual characteristics to make identifications - A. Identification  |
| QWNNXL-5351  | Each of Exhibits Q1 through Q4 were analyzed and determined to be suitable for source identification. The comparison of each of Exhibits Q1 through Q4 with the known tire and tire imprints depicted in Exhibit K resulted in source identifications. These source identifications were based upon correspondence of tread design, wear, and randomly acquired characteristics between the questioned imprints and the known tire and known tire imprints.  |
| R3942J-5355  | Q1: The tread design, physical size, wear, and multiple randomly acquired characteristics corresponded between Q1 and the K tire sections K6-K7. In my opinion, the K tire sections K6-K7 was the source of, and made, the Q1 impression. Another tire being the source of the impression is considered a practical impossibility. Identification. Q2: The tread design, physical size, wear, and multiple randomly acquired characteristics corresponded between Q2 and the K tire sections K2-K3. In my opinion, the K tire sections K2-K3 was the source of, and made, the Q2 impression. Another tire being the source of the impression is considered a practical impossibility. Identification. Q3: The tread design, physical size, wear, and multiple randomly acquired characteristics corresponded between Q3 and the K tire sections K8-K1. In my opinion, the K tire sections K8-K1 was the source of, and made, the Q3 impression. Another tire being the source of the impression is considered a practical impossibility. Identification. Q4: The tread design, physical size, wear, and multiple small randomly acquired characteristics corresponded between Q4 and the K tire sections K4-K3. In my opinion, the K tire sections K4-K3 was the source of, and made, the Q4 impression. Another tire being the source of the impression is considered a practical impossibility. Identification.  |



TABLE 2

| WebCode-Test | Conclusions  |
|--------------|--|
| RCH9EA-5355  | The results of the examination extremely strongly support that the imprints Q1, Q2, Q3 and Q4 were made with the recovered tire K (Level +4).  |
| RFXZ3G-5351  | Comparison examinations were conducted between the submitted unknown impressions and the submitted known impressions, exhibit 2. Exhibits 4.1, 4.2, 5.1 and 5.2 (unknown tire impressions Q1 through Q4) were made by the same tire that made exhibit 2, the submitted known tire impressions.   |
| T9DZM4-5351  | The submitted photographs contained questioned tire track impressions labeled as Q1 - Q4 by the agency. The questioned impressions Q1 - Q4 were visually compared to the images of a known tire and images of known test impressions produced from the known tire. The known tire was divided into segments K1 - K8 by the agency. Q1 corresponded in noise treatment pattern, size, and wear with areas in segments K6 and K7 of the known tire. In addition, voids in Q1 corresponded in shape, size, and orientation to damage on the tire in segments K6 and K7. In the opinion of the examiner, this tire made the questioned impression Q1 (Identification). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Q2 corresponded in noise treatment pattern, size, wear, and apparent manufacturing defects with areas in segments K2 and K3 of the known tire. In addition, voids in Q2 corresponded in shape, size, and orientation to damage on the tire in segments K2 and K3. In the opinion of the examiner, this tire made the questioned impression Q2 (Identification). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Q3 corresponded in noise treatment pattern, size, wear, and apparent manufacturing defects with areas in segments K8 and K1 of the known tire. In addition, voids in Q3 corresponded in shape, size, and orientation to damage on the tire in segments K8 and K1. In the opinion of the examiner, this tire made the questioned impression Q3 (Identification). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Q4 corresponded in noise treatment pattern, size, wear, and apparent manufacturing defects with areas in segments K3 and K4 of the known tire. In addition, voids in Q4 corresponded in shape, size, and orientation to damage on the tire in segments K3 and K4. In the opinion of the examiner, this tire made the questioned impression Q4 (Identification). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. |
| TBKHLZ-5351  | The partial, questioned tire track impressions of value, labeled Q1, Q2, and Q3, were each identified as being made from the known tire in Submission 001. The partial, questioned tire track impression of value, labeled Q4, corresponds with the physical size, tread elements, general condition of wear, as well as some individual characteristics with the known tire in Submission 001 and was probably made by this tire. Due to the substrate, overlay of impressions, as well as the limited number of observable individual characteristics, a closer association could not be made.   |
| UJ733H-5351  | Based on the similarity of tread pattern design, size, wear characteristics, and discernible, reproducible individual characteristics the recovered tire was identified as having made the questioned tire impressions Q1 through Q4.  |
| UJQKK7-5351  | The tire from which the images (Items K1 thru K8) and the inked imprints (Item K1_Ink thru K8_Ink) were obtained is identified as having made the impressions depicted in Items Q1, Q2, Q3, and Q4 based on an agreement of class characteristics (tread design and size), wear, and randomly acquired characteristics of sufficient quality and quantity. This tire was the source of the questioned impressions. Another tire being the source of these impressions is considered a practical impossibility.   |
| UTVRY7-5351  | When comparing the pictures of Q1, Q2, Q3, and Q4 with the recovered tire pictures, they matched not only in the patterns but also in the scratches and friction shapes, so Identification was concluded.  |

TABLE 2

| WebCode-Test | Conclusions   |
|--------------|---|
| V27DLE-5355  | Based on the above findings, I am of the opinion that the recovered imprints (Q1-Q4) found on the posterboard and cardboard respectively, were made by the recovered tire.  |
| VHDA8Y-5355  | (No Conclusions Reported.)  |
| VJLMMF-5355  | The tire responsible for the submitted test impressions is identified as the source of all four questioned impressions.   |
| W2K2M7-5351  | (Source Identification) Impression Q1 corresponds in tread design, physical size, wear and one randomly acquired characteristic with the Item 4 tire. Therefore, this tire was identified as the source of this impression. (Source Identification) Impression Q2 corresponds in tread design, physical size, wear and three randomly acquired characteristics with the Item 4 tire. Therefore, this tire was identified as the source of this impression. (Source Identification) Impression Q3 corresponds in tread design, physical size, wear and three randomly acquired characteristics with the Item 4 tire. Therefore, this tire was identified as the source of this impression. (Source Identification) Impression Q4 corresponds in tread design, physical size, wear and two randomly acquired characteristics with the Item 4 tire. Therefore, this tire was identified as the source of this impression.  |
| WCG6QZ-5355  | The questioned impressions marked "Q1" to "Q4" were examined and found to have been made by the recovered tire.   |
| WHNVT7-5351  | The known item K6-K7 is identified to have made the questioned item Q1. They share agreement of class and randomly acquired characteristics of sufficient quality and quantity. Highest degree of association. The known item K2-K3 is identified to have made the questioned item Q2. They share agreement of class and randomly acquired characteristics of sufficient quality and quantity. Highest degree of association. The known item K1-K8 is identified to have made the questioned item Q3. They share agreement of class and randomly acquired characteristics of sufficient quality and quantity. Highest degree of association. The known item K3-K4 is identified to have made the questioned item Q4. They share agreement of class and randomly acquired characteristics of sufficient quality and quantity. Highest degree of association.   |
| WLLC7Z-5351  | Item 1 contained 18 printed images. Eight of the images were of different portions of a tire labeled K1 - K8. Eight of the images were inked impressions of K1 - K8. Two of the images were labeled Q1-Q4 and had questioned tire track impressions on them. Q1 - Q4 were visually compared to K1 - K8. Q1 corresponded in tread design, physical size, wear characteristics and at least two randomly acquired characteristics to K6 and K7. In the opinion of examiner, K6 and K7 portions of tire made the questioned impression (Identification). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Q2 corresponded in tread design, physical size, wear characteristics and at least eight randomly acquired characteristics to K2 and K3. In the opinion of examiner, the K2 and K3 portions of tire made the questioned impression (Identification). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Q3 corresponded in tread design, physical size, wear characteristics and at least eight randomly acquired characteristics to K1 and K8. In the opinion of examiner, the K1 and K8 portions of tire made the questioned impression (Identification). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Q4 corresponded in tread design, physical size, wear characteristics and at least two randomly acquired characteristics to K3 and K4. In the opinion of the examiner, the questioned impression was made either K3 and K4 of this tire or by another tire with corresponding class characteristics, wear, and randomly acquired characteristics as observed in the questioned impression (High degree of association). The corresponding wear and randomly acquired characteristics indicate a strong association; however, the quality were insufficient for an identification. |

## TABLE 2

| WebCode-Test | Conclusions  |
|--------------|--|
| WQYVMG-5351  | Tire track analysis disclosed four (4) partial tire tracks exhibiting sufficient characteristics to be of value for comparison and evaluation purposes. Suitable Partial Tire Tracks Recovered From: "Blue poster board" and "Piece of cardboard" The submitted printouts of the tire test impressions of an Ironman radial tire size 205/55R16 were compared and evaluated to the four (4) partial tire tracks of value. Size, tread design, tread pattern, tire element physical dimensions and corresponding randomly acquired characteristics were noted between the partial tire tracks depicted in Q1, Q2, Q3 and Q4 and the submitted tire test impressions. The tire making the tire test impressions is identified as a source of these partial tire tracks.  |
| WU2VPY-5351  | The photographs of the recovered Ironman tire segments (K1-K8) and the test impressions (K1 ink - K8 ink) were visually compared to the photographs of the questioned imprints (Q1-Q4). The partial tire imprint (Q1) is consistent in tread design, physical shape and size, noise treatment, wear, and in the location, position, and orientation of randomly acquired characteristics as the recovered tire in segments K6-K7. Therefore, the imprint (Q1) was IDENTIFIED as having been made by the recovered Ironman tire (Segments K6-K7). The partial tire imprint (Q2) is consistent in tread design, physical shape and size, noise treatment, wear, and in the location, position, and orientation of randomly acquired characteristics as the recovered tire in segments K2-K3. Therefore, the imprint (Q2) was IDENTIFIED as having been made by the recovered Ironman tire (Segments K2-K3). The partial tire imprint (Q3) is consistent in tread design, physical shape and size, noise treatment, wear, and in the location, position, and orientation of randomly acquired characteristics as the recovered tire in segments K8-K1. Therefore, the imprint (Q3) was IDENTIFIED as having been made by the recovered Ironman tire (Segments K8-K1). The partial tire imprint (Q4) is consistent in tread design, physical shape and size, noise treatment, wear, and in the location, position, and orientation of randomly acquired characteristics as the recovered tire in segments K3-K4. Therefore, the imprint (Q4) was IDENTIFIED as having been made by the recovered Ironman tire (Segments K3-K4).  |
| XFWZ6C-5351  | Exhibits 4.1, 4.2, 5.1 and 5.2 (unknown tire impressions Q1 through Q4) were identified as having been made by the same tire that made exhibit 2, the submitted known tire impressions.  |
| XKUDR2-5351  | (A). The questioned imprint items Q1 and Q2 share agreement of class and randomly acquired characteristics of sufficient randomly quality and quantity to those of the known imprint items K6_ink and K7_ink and items K2_ink and K3_ink, respectively. (B). The questioned imprint items Q3 and Q4 correspondence of class characteristics, in addition to unusual wear and/or one or more randomly acquired characteristics to those of the known imprint items K8_ink and K1_ink and items K3_ink and K4_ink, respectively. Therefore, based on the findings, in my professional opinion, the recovered tire was the source of, and made, the questioned imprints by items Q1, Q2, Q3 and Q4.   |
| XPLN2Z-5351  | Four questioned tire track impressions (Q1 through Q4) were visually compared to the submitted photographs of a known Ironman tire and its test impressions. Questioned impressions Q1 through Q3 corresponded in tread design, physical size, pitch sequence, and wear characteristics to portions of the known tire: - Q1: segments labeled K6 and K7 - Q2: segments labeled K2 and K3 - Q3: adjacent segments labeled K8 and K1 Multiple void areas in each questioned impression corresponded in approximate size, shape, position, and orientation to randomly acquired characteristics on the known tire. In the opinion of the examiner, the known Ironman tire made questioned impressions Q1, Q2, and Q3 (Identification). While this opinion cannot specifically exclude all other sources, the quality and extent of corresponding features would not be expected in other tires. Questioned impression Q4 also corresponded in tread design, physical size, pitch sequence, and wear characteristics to a portion of the known tire (segments labeled K3 and K4). Multiple void areas in the questioned impression corresponded in approximate size, shape, position, and orientation to voids on the known tire's test impression; however, many of these lacked complexity and/or could not be confirmed in the submitted known tire photographs. In the opinion of the examiner, questioned impression Q4 was made either by the known Ironman tire or by another tire with corresponding class characteristics, wear, and randomly acquired characteristics as observed in the questioned impression (High degree of association). The corresponding |

TABLE 2

| WebCode-Test | Conclusions   |
|--------------|---|
|              | wear and randomly acquired characteristics indicate a strong association; however, the quality and/or quantity were insufficient for an identification. This comparison was limited by the submission of only one photograph per segment of the known tire, the cardboard substrate, and the overlap with questioned impression Q3.   |
| YR9J2D-5351  | A questioned impression from the blue poster board (Q1) was determined to be a partial tire impression. An additional questioned impression from the blue poster board (Q2) was determined to be a tire impression. This partial tire impression and tire impression are similar in class characteristics (tread design, size), wear, and share randomly acquired characteristics with the recovered tire (K1-K8). It is our opinion that the partial tire impression and tire impression were made by the recovered tire from suspect vehicle. Questioned impressions from the piece of cardboard (Q3, Q4) were determined to be tire impressions. The tire impressions are similar in class characteristics (tread design, size), wear, and share randomly acquired characteristics with the recovered tire (K1-K8). It is our opinion that these tire impressions were made by the recovered tire from suspect vehicle.  |
| YUE6RY-5355  | The questioned imprint Q1 shares agreement of class characteristics and randomly acquired characteristics of sufficient quality and quantity with the recovered tire (Ironman, 205/55R16) and the known imprint (segments K6 - K7), which were made with the tire. The recovered tire was the source of, and made, the questioned imprint Q1. Another item of tire being the source of the imprint is considered a practical impossibility. The questioned imprint Q2 shares agreement of class characteristics and randomly acquired characteristics of sufficient quality and quantity with the recovered tire (Ironman, 205/55R16) and the known imprint (segments K2 - K3), which were made with the tire. The recovered tire was the source of, and made, the questioned imprint Q2. Another item of tire being the source of the imprint is considered a practical impossibility. The questioned imprint Q3 shares agreement of class characteristics and randomly acquired characteristics of sufficient quality and quantity with the recovered tire (Ironman, 205/55R16) and the known imprint (segments K8 - K1), which were made with the tire. The recovered tire was the source of, and made, the questioned imprint Q3. Another item of tire being the source of the imprint is considered a practical impossibility. The questioned imprint Q4 shares agreement of class characteristics and randomly acquired characteristics of sufficient quality and quantity with the recovered tire (Ironman, 205/55R16) and the known imprint (segment K4), which were made with the tire. The recovered tire was the source of, and made, the questioned imprint Q4. Another item of tire being the source of the imprint is considered a practical impossibility. |
| ZAZ8MT-5355  | Q1-Q4 are tire impressions which were compared to the known suspect tire K. The tread design, physical size and general wear of Q1, Q2, Q3 and Q4 correspond to K. In addition there are several corresponding randomly acquired characteristics. Therefore it was determined that impressions Q1 – Q4 were made by this tire, K.   |

# Additional Comments

TABLE 3

| WebCode-Test | Additional Comments  |
|--------------|--|
| AJYWJL-5351  | <p>Associative Key for Footwear or Tire Impressions: Identification: This is the highest degree of association. The questioned impression and the known footwear or tire share agreement of class and randomly acquired characteristics of sufficient quality and quantity. The particular known footwear or tire was the source of, and made, the questioned impression and another tire or item of footwear being the source of this impression is considered a practical impossibility. High Degree of Association: The characteristics observed exhibit strong associations between the questioned impression and the known footwear or tire; however, the quality and/or quantity were insufficient for an identification. Other footwear or tires with the same characteristics are included as possible sources only if they display the same class characteristics and/or randomly acquired characteristics observed in the questioned impression. Association of Class Characteristics: The known footwear or tire is a possible source of the questioned impression and therefore could have produced the questioned impression. Other footwear or tires with the same class characteristics are included as possible sources of the questioned impression. Limited Association of Class Characteristics: Certain factors have limited the conclusion to a general association of class characteristics. Other footwear or tires with the same class characteristics are included as possible sources of the questioned impression. Indications of Non-Association: Dissimilarities between the questioned impression and the known footwear or tire indicated non- association; however, the details or features were not sufficient to permit an exclusion. Exclusion: The particular known footwear or tire did not make the questioned impression.</p> |
| APKPVL-5351  | <p>RACs were difficult to confirm on the actual known tire photographs due to not having any oblique lighting to highlight those characteristics as you would perform in casework.</p>   |
| BVLLRQ-5351  | <p>I recommend photographing the tread of the tire using oblique lighting from multiple angles and providing those images to participants since some of the small details were difficult to discern and learn their specific shape given the ambient light conditions used to prepare K1-K8. You should use the same method used in the footwear test. I recommend improving your test impression making process to avoid so many void areas, and the supplemental test impression was way too light and full of void areas.</p>   |
| CV6RRG-5351  | <p>Would it be possible for future tire tread impression proficiencies to include photographs of the tires (with different lighting conditions like oblique illumination) in the digital download supplemental in addition to the inked impressions?</p>   |
| G6EMXH-5351  | <p>The support of the known prints made with the recovered tire (k1_ink-k8_ink) is not the same as the material on which the tire prints were found at the crime scene (Q1, Q2, Q3, Q4), which is why there were makes it difficult to visualize the behavior of the prints. -In the overlapping fragments Q3 and Q4, there was greater difficulty, since the individual and class characteristics were not visualized, because they were superimposed. -When digitizing the segments of the known tires and superimposing them with the fragments of the engravings found at the scene or unknown, it was difficult since the dimension was lost in order to match the physical characteristics between the known and unknown.</p>  |
| JC3GLQ-5351  | <p>There was a series of digital photographs provided through the CTS Portal which contained photographs of an additional set of known inked exemplars (K1_Sup through K8_Sup). These digital photographs were compared with the printed version (Items 001-K1_ink through 001-K8_ink) to evaluate the reproducibility of the class and individual features represented in the known impressions. There were a lot of reproducible features in both sets of the known impressions that did not appear in the questioned impressions and could not be readily attributed to areas observed in the photographs of the known tire (Items 001-K1 though 001-K8). The two sets of known impressions were nearly identical in term of the appearance of the pattern and features within the impressions, such that it appears that the printed version was likely made first and the downloaded version appears to just be a continuation of that first series of known impressions without there being another application of the ink material to the tire in between the two sets of known impressions. These artifacts appear to be representative of the inking process used to apply the ink materials to the tire prior to the creation of the impression standards, and thus not representative of the reproducibility of the tires features in the two sets of the impressions. If the tire was rolled through the ink one time and then rolled continuously to create both the printed and</p>  |

TABLE 3

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|--------------|--|
|              | digital downloads of the known impressions this could account for some of the reproducible features represented in both set of standards provided which were subsequently absent in the photographs of the known tire (Item 001-K1 through 001-K8) and the questioned impressions (Q1 through Q-4).  |
| K6JEEN-5351  | It would be great if in addition to the digital files for the test impressions, the digital files for the questioned impressions were also included.   |
| L8LVPP-5351  | The instructions need to be more clear with regard to listing the segments of known tire that made the impressions. It's clear if exactly half of one segment and half of the next made the Q impression; both K's would be listed. But what about 60% of one and 40% of the next? 75/25? 90/10?   |
| RCH9EA-5355  | A suggestion for future test is to have three-dimensional questioned impressions which is the most common in our real case works.  |
| UJ733H-5351  | The standard inked tire impressions are not acceptable standards and would be retaken if this were an actual case. It is unknown if they were taken this way for testing purposes or if the preparer is not aware that debris and/or floor texture can affect the quality of the test impressions. The photography of the standard tire itself would also be unacceptable due to inadequate lighting technique. Again, it is unknown if this was done for testing purposes or the photographer is not aware of the importance of lighting technique.   |
| W2K2M7-5351  | The clarity and detail of this test was very difficult. Especially the Q4 impression. The RACs were very small.  |
| WLLC7Z-5351  | Association Scale for Footwear and Tire Impressions The following descriptions are meant to provide context to the levels of opinions reached in footwear and tire impression comparisons. Each level may not include every variable in every case. Lacks sufficient detail – No comparison was conducted: the examiner determined there were no discernible questioned footwear/tire impressions or features present. Or – A comparison was conducted: the examiner determined that there was insufficient detail in the questioned impression for a meaningful conclusion. This opinion only applies to the known footwear or tire that was examined and does not necessarily preclude future examinations with other known footwear or tires. Exclusion – This is the highest degree of non-association expressed in footwear and tire impression examinations. Sufficient differences were noted in the comparison of class and/or randomly acquired characteristics between the questioned impression and the known footwear or tire. Indications of non-association – The questioned impression exhibits dissimilarities when compared to the known footwear or tire; however, the details or features were not sufficiently clear to permit an exclusion. Limited association of class characteristics – Some similar class characteristics were present; however, there were significant limiting factors in the questioned impression that did not permit a stronger association between the questioned impression and the known footwear or tire. These factors may include but were not limited to: insufficient detail, lack of scale, improper position of scale, improper photographic techniques, distortion or significant lengths of time between the date of the occurrence and when the footwear or tires were recovered that could account for a different degree of general wear. No confirmable differences were observed that could exclude the footwear or tire. Association of class characteristics – The class characteristics of both design and physical size must correspond between the questioned impression and the known footwear or tire. Correspondence of general wear may also be present. High degree of association – The questioned impression and known footwear or tire must correspond in the class characteristics of design, physical size, and general wear. For this degree of association there must also exist: (1) wear that, by virtue of its specific location, degree and orientation make it unusual and/or (2) one or more randomly acquired characteristics. Identification – This is the highest degree of association expressed by a footwear and tire impression examiner. The questioned impression and the known footwear or tire share agreement of class and randomly acquired characteristics of sufficient quality and quantity. |
| XPLN2Z-5351  | An association scale would be included in the report.  |

-End of Report-  
(Appendix may follow)

## Test No. 23-5351: Tire Track Imprint Evidence

DATA MUST BE SUBMITTED BY **Sept. 18, 2023, 11:59 p.m. EDT** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A

WebCode: 8Q9E3W

The Accreditation Release section can be accessed by using the "Continue to Final Submission" button above. This information can be entered at any time prior to submitting to CTS.

### **Scenario:**

Police are investigating a burglary at a residence. Tire track imprints were recovered on objects close to the house where the reported robbery took place. The imprints are believed to have been left by the suspect vehicle. The day of the incident, approximately three miles from the residence, the suspect vehicle was located. Investigators were able to recover one tire directly from the vehicle. You are asked to compare the imprints recovered at the scene with photographs of the tire and known imprints made with the tire. The recovered tire contains the following information on the sidewall: Ironman, 205/55R16 91V M+S, Tubeless steel belted radial, DOT 00K JFEAAJ.

*Known, inked imprints (K1\_Ink through K8\_Ink) have been labeled with an arrow to indicate directionality of movement. These inked imprints were made by placing the vehicle in neutral, and then pushing it across inking material and a continuous piece of white containerboard.*

*CTS provides a digital download supplemental for the Tire Track Imprint Evidence test series. This supplemental contains an additional set of known inked exemplars (K1\_Sup-K8\_Sup), accessible through a link on the CTS Portal data entry form (see below). While the photo packet contains all materials necessary to complete the test as presented, the supplemental is intended to bolster participant confidence in their conclusions.*

*For the supplemental images, you are not limited to conducting only on-screen comparisons and may employ any other method you wish. However, because of differences in printing technology, CTS cannot guarantee the quality of images you print from the digital media.*

### **Items Submitted (Sample Pack TIEP - Photographs):**

K1-K8: Photographs of the recovered tire (segments), lighted from above.

K1\_Ink-K8\_Ink: Images of known imprints made with the recovered tire (segments).

K1\_Sup-K8\_Sup: Digital supplemental images of known imprints made with the recovered tire (segments).

Q1-Q2: Photograph of questioned imprints found on blue posterboard.

Q3-Q4: Photograph of questioned imprints found on a piece of cardboard.

To verify a complete and accurate download, the hash value for the downloaded .ZIP file is as follows:

23-5351.5\_Tire Track\_Supplemental.zip MD5 hash value: 415a82d8d7900b5b106f49251a6418ca

23-5351.5\_Tire Track\_Supplemental.zip SHA1 hash value: ec59f36c18a904e65c7aab9beb0d614b851c90ec

**Instructions:**

Select from the following list of conclusions and insert the appropriate letter in the spaces provided. If the wording below differs from the normal wording of your conclusions, adapt these conclusions as best you can and use your preferred wording in your written conclusions. These conclusions are adapted from the SWGTREAD Range of Conclusions standard.

**A. Identification** - Questioned and known items share agreement of class and randomly acquired characteristics of sufficient quality and quantity. Highest degree of association.

**B. High degree of association** - Correspondence of class characteristics, in addition to unusual wear and/or one or more randomly acquired characteristics between the questioned and known item.

**C. Association of class characteristics** - Correspondence of design and physical size and possibly general wear between the questioned and known item.

**D. Limited association of class characteristics** - Some similar class characteristics between the questioned and known item with significant limiting factors.

**E. Inconclusive\*** - Questioned item lacks sufficient detail for a meaningful conclusion in comparison to the known item. (adapted from SWGTREAD "Lacks sufficient detail" conclusion).

**F. Indications of non-association** - Questioned item exhibits dissimilarities in comparison to the known item.

**G. Exclusion** - Questioned and known items exhibit sufficient differences of class and/or randomly acquired characteristics. Highest degree of non-association.

\*Should the response "E" be used, please document the reason in the Additional Comments section of this data sheet.

**1.) Indicate the results of your comparisons of the recovered tire with the questioned imprints by writing the letter of your conclusion next to each questioned imprint in the table.**

If an identification or positive association is made (A-D), indicate to which segment(s) of the tire the association has been made. Report a single segment or multiple segments like the example shown below.

Example:

|                |   |                   |
|----------------|---|-------------------|
| <u>Imprint</u> |   | <u>Segment(s)</u> |
| Q1:            | B | K1                |

|                |   |                   |
|----------------|---|-------------------|
| <u>Imprint</u> |   | <u>Segment(s)</u> |
| Q2:            | A | K1-K2             |

Blue Posterboard

|                |  |                   |
|----------------|--|-------------------|
| <u>Imprint</u> |  | <u>Segment(s)</u> |
| Q1:            |  |                   |
| Q2:            |  |                   |

Piece of Cardboard

|                |  |                   |
|----------------|--|-------------------|
| <u>Imprint</u> |  | <u>Segment(s)</u> |
| Q3:            |  |                   |
| Q4:            |  |                   |



**2.) What would be the wording of the Conclusions in your report?**

*Please note: Any additional formatting applied in the free form spaces below will not transfer to the Summary Report and may cause your information to be illegible. This includes additional spacing and returns that present your responses in lists and tabular formats.*

**3.) Additional Comments**

## RELEASE OF DATA TO ACCREDITATION BODIES

The Accreditation Release is accessed by pressing the "Continue to Final Submission" button online and can be completed at any time prior to submission to CTS.

CTS submits external proficiency test data directly to ASCLD/LAB, ANAB, and/or A2LA. Please select one of the following statements to ensure your data is handled appropriately.

- This participant's data is intended for submission to ASCLD/LAB, ANAB, and/or A2LA. (Accreditation Release section below must be completed.)
- This participant's data is **not** intended for submission to ASCLD/LAB, ANAB, and/or A2LA.

Have the laboratory's designated individual complete the following steps only if your laboratory is accredited in this testing/calibration discipline by one or more of the following Accreditation Bodies.

### Step 1: Provide the applicable Accreditation Certificate Number(s) for your laboratory.

ANAB Certificate No.   
(Include ASCLD/LAB Certificate here)

A2LA Certificate No.

### Step 2: Complete the Laboratory Identifying Information in its entirety.

Authorized Contact Person and Title

Laboratory Name

Location (City/State)