



## **DNA Interpretation Test No. 16-588 Summary Report**

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This proficiency test was sent to 29 participants. Each participant received a sample pack consisting of a DVD containing electropherograms which they were requested to evaluate using their existing protocols. Data were returned from 20 participants (69% response rate) and are compiled into the following tables:

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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 pack contained digital images and .fsa files consisting of electropherograms from DNA profiles of two known samples (Items 1 & 2) and two questioned samples (Items 3 & 4). Participants were requested to evaluate the electropherograms and interpret the data using their existing protocols.

SAMPLE PREPARATION: Item 1 was created using blood collected from a male donor and Item 2 was created using blood collected from a female donor. The Item 3 mixture was created by combining three parts of blood from the Item 1 male donor and one part of blood from the Item 2 female donor. The Item 4 mixture was created using one part of blood from the Item 1 male and one part of blood collected from another male donor.

SAMPLE SET ASSEMBLY: Once sample preparation and verification was completed, each DVD was checked to ensure all images were accessible.

VERIFICATION: Laboratories that conducted predistribution testing of the electropherograms reported consistent results for all loci. All associations were consistent amongst the predistribution laboratories.

### Amelogenin and STR Results

Results compiled from predistribution laboratories and a consensus of participants.

Item	<b>D2S1338 D16S539 FGA</b>	<b>D3S1358 D18S51 PentaD</b>	<b>D5S818 D19S433 PentaE</b>	<b>D7S820 D21S11 TH01</b>	<b>D8S1179 Amelogenin TPOX</b>	<b>D13S317 CSF1PO vWA</b>
1	17,25 9,11 24,24	15,16 13,16 *	11,12 14,15.2 *	10,12 30,31.2 6,9.3	12,13 X,Y 8,11	10,13 11,12 16,16
2	19,20 10,11 21,24	15,17 17,18 *	11,12 13,15 *	12,14 29,30 7,9	10,12 X,X 8,11	9,11 11,12 15,17
3 major	17,25 9,11 24,24	15,16 13,16 *	11,12 14,15.2 *	10,12 30,31.2 6,9.3	12,13 X,Y 8,11	10,13 11,12 16,16
3 minor	19,20 *10,11 *21,24	*15,17 17,18 *	*11,12 13,15 *	*12,14 *29,30 7,9	*10,12 *X,X *8,11	9,11 *11,12 15,17
4 major	*22,23 *8,10 *20,24	*15,16 17,17 *	*9,11 *12,14 *	11,11 *30,33.1 8,9.3	*10,13 *X,Y 8,9	11,13 *10,12 *15,17
4 minor	*17,25 *9,11 *24,24	* *13,16 *	*11,12 *14,15.2 *	10,12 *30,31.2 *6,9.3	* *X,Y *8,11	*10,13 *11,12 *16,16

NOTE- Typically results from at least 10 participants must be received to form a consensus, however, in this case certain STR loci were reported by less than 10 participants. The above STR results represent the consensus among these participants. An "\*" represents a locus with less than 10 participants reporting. If allelic results accompany the asterisk, this indicates that a minimum of 5 participants reported results for the locus.

### YSTR Results

Results compiled from predistribution laboratories and a consensus of participants.

Item	<b>DYS19 DYS437 DYS549</b>	<b>DYS385 DYS438 DYS570</b>	<b>DYS389-I DYS439 DYS576</b>	<b>DYS389-II DYS448 DYS635</b>	<b>DYS390 DYS456 DYS643</b>	<b>DYS391 DYS458 Y GATA H4</b>	<b>DYS392 DYS481</b>	<b>DYS393 DYS533</b>
1	14 15,16 12	12,13 12 18	13 10,11 19	29,30 19 23	23 15 10	11 16 11	13 24	13 12
3 (Male Donor)	14 15,16 *12	12,13 12 *18	13 10,11 *19	29,30 19 23	23 15 *10	11 16 11	13 *24	13 *12
4 (Mixture)	14,15 14,15,16 12	12,13,14,16 10,12 18,21	13,14 10,11 19	29,30 19 22,23	23 14,15 10,12	10,11 16 11	12,13 24	13,15 12,13

NOTE- Typically results from at least 10 participants must be received to form a consensus, however, in this case certain YSTR loci were reported by less than 10 participants. The above YSTR results represent the consensus among these participants. An "\*" represents a locus with less than 10 participants reporting. If allelic results accompany the asterisk, this indicates that a minimum of 5 participants reported results for the locus.

## **Summary Comments**

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This test was designed to allow participants to assess their proficiency in evaluating and interpreting electropherogram data. Each participant received electropherograms (in both FSA and PDF formats) of four items that had each been processed using the following kits: Identifiler Plus, PowerPlex 16HS, Yfiler, PowerPlex Y23.

Of the 20 participants that reported results, 19 included the victim (Item 1) as a possible contributor to the Item 3 mixture while one reported an inconclusive result, and 15 included the suspect (Item 2) as possible contributor to the Item 3 mixture profile while three reported an inconclusive result. All 20 participants included the victim (Item 1) as a possible contributor to the Item 4 mixture profile, while 15 participants excluded the suspect (Item 2) as a possible contributor to the Item 4 mixture profile and three reported inconclusive results. The same three participants reported inconclusive results for the suspect (Item 2) in relation to the contribution of the suspect to both the Item 3 mixture and the Item 4 mixture.

Fifteen of the 20 participants reported STR results. Two of these 15 participants reported results for the Item 3 mixture without separating the profiles into major and minor components, while 13 of the participants split their results across the major and minor profile entry. Of these 13 participants that split their Item 3 results, six participants reported only the major and minor profiles, while seven participants reported a mixed Item 3 profile along with the major and minor profiles. All but one profile for the Item 3 mixture were in agreement with the consensus profile, and the one departure from the consensus was due to additional alleles in the major profile and inconsistent alleles in the minor profile.

Five of the 15 participants that reported STR results reported results for the Item 4 mixture without separating the profiles into major and minor components, while 10 of the participants split their results across the major and minor profile entry. Of these 10 participants that split their Item 4 results, three participants reported only the major and minor profiles, while seven participants reported a mixed Item 4 profile along with the major and minor profiles. All but three profiles for the Item 4 mixture were in agreement with the consensus profile, with all three of the profiles showing a symbol or inconsistent allele for the microvariant allele reported at D21S11.

Fifteen of the 20 participants reported YSTR results. All participants reported consistent YSTR allelic results for Item 1, the Item 3 mixture, and the Item 4 mixture. For the Item 3 mixture, 11 of the participants reported the results without separating the profiles into major and minor components. The remaining four participants split the YSTR data for the Item 3 mixture into major and minor categories, with two of the four participants only reporting the major category, and the remaining two participants reporting both the major and minor components. For the Item 4 mixture, 14 of the participants reported the results without separating the profiles into major and minor components. The one remaining participant split the Item 4 mixture into the major and minor components.

Of the 20 participants reporting the number of contributors to the Item 3 mixture, 16 reported that there were either "two", "possibly two" or "at least two" contributors. All 20 participants reported the number of contributors to the Item 4 mixture as either "two" or "at least two".

# Interpretation Guidelines

TABLE 1

WebCode	Analytical Threshold	Peak Height Ratio	Stochastic Threshold
2VWGKV	STR: 75 RFU STR; YSTR: 75 RFU	STR: 60%; YSTR: 50%	STR: 50 RFU; YSTR: 75 RFU
8YHBNP	75	60	50
BK6AGN	ID+ 75 RFUs; PPY23 50 RFUs	ID+ 40%; PPY23 None	ID+ 150 RFUs; PPY23 200 RFUs (for DYS385)
BTFC3P	ID+ 75 rfu; PPY23 50 rfu	ID+ 40%; PPY23 none	ID+ 150 rfu; PPY23 200 rfu (DYS385)
CDKHVG	35RFU	150 to 699RFU: 30% >700RFU: 60%	150RFU
CJ4W9L	50rfu	50%	n/a
D249GM	50	60	100
D6BFAF	75 rfu	60%	250 rfu
EBNYGK	50 rfu	60%	200 rfu
GEWYQG	Identifiler Plus = 75, Powerplex Y23 = 30	60	50
GVT6AC	85 RFU	30%	300 RFU
H4FF7K	50 rfu	50	400rfu to confirm peak, 1500 or two observations >1000 for homozygote
HWVCYH	50 rfu	60%	150 rfu
K8Q6KD			
LJEQ4E	50	60	150
M2AJPC	50 RFU	N/A	N/A
RK8RA4	75 rfu, as per guidelines below.	60% or 50%, as per guidelines below.	50 rfu or 75 rfu, as per guidelines below.
UXN8Q9	Powerplex Y23 :- 50rfu	50%	1500 rfu (Drop in threshold 400rfu)
VYHCK8	175	60	350
XQDEPZ	80 rfu	60 %	200 rfu

**STR & Amelogenin Results**

TABLE 2

WebCode	Item	D2S1338 D16S539 FGA	D3S1358 D18S51 Penta D	D5S818 D19S433 Penta E	D7S820 D21S11 TH01	D8S1179 Amelogenin TPOX	D13S317 CSF1PO vWA
Item 1							
2VWGKV	Identifiler® Plus (PDF Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24			6,9.3	8,11	16
8YHBNP	Identifiler® Plus (FSA Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24			6,9.3	8,11	16
BK6AGN	Identifiler® Plus (PDF Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24,24			6,9.3	8,11	16,16
BTFC3P	Identifiler® Plus (PDF Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24,24			6,9.3	8,11	16,16
CDKHVG	Identifiler® Plus (FSA Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24,24			6,9.3	8,11	16,16
D249GM	Identifiler® Plus (FSA Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24	-	-	6,9.3	8,11	16
D6BFAF	Identifiler® Plus (FSA Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24,24			6,9.3	8,11	16,16
EBNYGK	Identifiler® Plus (FSA Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24,24	-	-	6,9.3	8,11	16,16

TABLE 2

WebCode	Item	D2S1338 D16S539 FGA	D3S1358 D18S51 Penta D	D5S818 D19S433 Penta E	D7S820 D21S11 TH01	D8S1179 Amelogenin TPOX	D13S317 CSF1PO vWA
<b>Item 1</b>							
GEWYQG	Identifiler® Plus (PDF Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24,24	N/A	N/A	6,9.3	8,11	16,16
GVT6AC	Identifiler® Plus (FSA Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24			6,9.3	8,11	16
HWVCYH	PowerPlex®16 (FSA Format)						
	1		15,16	11,12	10,12	12,13	10,13
		9,11	13,16		30,31.2	X,Y	11,12
		24	12	11,15	6,9.3	8,11	16
LJEQ4E	Identifiler® Plus (PDF Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24			6,9.3	8,11	16
RK8RA4	Identifiler® Plus (PDF Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24,24			6,9.3	8,11	16,16
VYHCK8	Identifiler® Plus (PDF Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24	-	-	6,9.3	8,11	16
XQDEPZ	Identifiler® Plus, PowerPlex®16 (FSA Format)						
	1	17,25	15,16	11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24,24	12,12	11,15	6,9.3	8,11	16,16

TABLE 2

WebCode	Item	D2S1338	D3S1358	D5S818	D7S820	D8S1179	D13S317
		D16S539	D18S51	D19S433	D21S11	Amelogenin	CSF1PO
		FGA	Penta D	Penta E	TH01	TPOX	vWA
<b>Item 2</b>							
2VWGKV	Identifiler® Plus (PDF Format)						
2		19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X	11,12
		21,24			7,9	8,11	15,17
8YHBNP	Identifiler® Plus (FSA Format)						
2		19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X	11,12
		21,24			7,9	8,11	15,17
BK6AGN	Identifiler® Plus (PDF Format)						
2		19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24			7,9	8,11	15,17
BTFC3P	Identifiler® Plus (PDF Format)						
2		19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24			7,9	8,11	15,17
CDKHVG	Identifiler® Plus (FSA Format)						
2		19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24			7,9	8,11	15,17
D249GM	Identifiler® Plus (FSA Format)						
2		19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24	-	-	7,9	8,11	15,17
D6BFAF	Identifiler® Plus (FSA Format)						
2		19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24			7,9	8,11	15,17
EBNYGK	Identifiler® Plus (FSA Format)						
2		19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24	-	-	7,9	8,11	15,17



TABLE 2

WebCode	Item	D2S1338 D16S539 FGA	D3S1358 D18S51 Penta D	D5S818 D19S433 Penta E	D7S820 D21S11 TH01	D8S1179 Amelogenin TPOX	D13S317 CSF1PO vWA
<b>Item 2</b>							
GEWYQG	Identifiler® Plus (PDF Format)						
	2	19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24	N/A	N/A	7,9	8,11	15,17
GVT6AC	Identifiler® Plus (FSA Format)						
	2	19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X	11,12
		21,24			7,9	8,11	15,17
HWVCYH	PowerPlex®16 (FSA Format)						
	2		15,17	11,12	12,14	10,12	9,11
		10,11	17,18		29,30	X	11,12
		21,24	9,14	5,12	7,9	8,11	15,17
LJEQ4E	Identifiler® Plus (PDF Format)						
	2	19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X	11,12
		21,24			7,9	8,11	15,17
RK8RA4	Identifiler® Plus (PDF Format)						
	2	19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24			7,9	8,11	15,17
VYHCK8	Identifiler® Plus (PDF Format)						
	2	19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24	-	-	7,9	8,11	15,17
XQDEPZ	Identifiler® Plus, PowerPlex®16 (FSA Format)						
	2	19,20	15,17	11,12	12,14	10,12	9,11
		10,11	17,18	13,15	29,30	X,X	11,12
		21,24	9,14	5,12	7,9	8,11	15,17

TABLE 2

WebCode	Item	D2S1338 D16S539 FGA	D3S1358 D18S51 Penta D	D5S818 D19S433 Penta E	D7S820 D21S11 TH01	D8S1179 Amelogenin TPOX	D13S317 CSF1PO vWA
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## Item 3

2VWGKV Identifiler® Plus (PDF Format)

3	17,(19),(20),25	15,16,(17)	11,12	10,12,(14)	(10),12,13	(9),10,(11),13
	9,(10),11	13,16,(17),(18)	(13),14,(15),15.2	(29),30,31.2	X,Y	11,12
	(21),24			6,(7),(9),9.3	8,11	(15),16,(17)
3 major	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24			6,9.3	8,11	16
3 minor	19,20	15,17	11,12	12,14	10,12	9,11
	10,11	17,18	13,15	29,30	X	11,12
	21,24			7,9	8,11	15,17

8YHBNP Identifiler® Plus

3 major	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24			6,9.3	8,11	16
3 minor	19,20	17		14	10	9,11
	10	17,18	13,15	29		
	21			7,9		15,17

BK6AGN Identifiler® Plus (PDF Format)

3			11,12			
	9,10,11					11,12
	21,24				8,11	
3 major	17,25	15,16		10,12	12,13	10,13
		13,16	14,15.2	30,31.2	X,Y	
				6,9.3		16
3 minor	19,20	15,17		12,14	10	9,11
		17,18	13,15	29,30	X	
				7,9		15,17

BTFC3P Identifiler® Plus (PDF Format)

3					10,12,13	
	9,10,11					
	21,24					
3 major	17,25	15,16	11,12	10,12		10,13
		13,16	14,15.2	30,31.2	X,Y	11,12
				6,9.3	8,11	16
3 minor	19,20	15,17	11,12	12,14		9,11
		17,18	13,15	29,30	X	11,12
				7,9	8,11	15,17

TABLE 2

WebCode	Item	D2S1338 D16S539 FGA	D3S1358 D18S51 Penta D	D5S818 D19S433 Penta E	D7S820 D21S11 TH01	D8S1179 Amelogenin TPOX	D13S317 CSF1PO vWA
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## Item 3

CDKHVG Identifiler® Plus (FSA Format)

3	17,19,20,25	15,16,17	11,12	10,12,14	10,12,13	9,10,11,13
	9,10,11	13,16,17,18	13,14,15,15.2	29,30,31.2	X,Y	11,12
	21,24			6,7,9,9.3	8,11	15,16,17
3 major	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24,24			6,9.3	8,11	16,16
3 minor	19,20	17,-		14,-	10,-	9,11
	10,-	17,18	13,15	29,-		
	21,-			7,9		15,17

D249GM Identifiler® Plus (FSA Format)

3			11,12			11,12
					8,11	
3 major	17,25	15,16		10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	
	24	-	-	6,9.3		16
3 minor	19,20	15,17		12,14	10,12	9,11
	10,11	17,18	13,15	29,30	X,X	
	21,24	-	-	7,9		15,17

D6BFAF Identifiler® Plus (FSA Format)

3	17,[19],[20],25	15,16,[17]	11,12	10,12,[14]	[10],12,13	[9],10,[11],13
	9,[10],11	13,16,[17],[18]	[13],14,[15],15.2	[29],30,31.2	X,Y	11,12
	[21],24			6,[7],[9],9.3	8,11	[15],16,[17]

EBNYGK Identifiler® Plus (FSA Format)

3	17,19,20,25	15,16,17	11,12	10,12,14	10,12,13	9,10,11,13
	9,10,11	13,16,17,18	13,14,15,15.2	29,30,31.2	X,Y	11,12
	21,24	-	-	6,7,9,9.3	8,11	15,16,17

GEWYQG Identifiler® Plus (PDF Format)

3 Major	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24,24	-	-	6,9.3	8,11	16,16
3 Minor	19,20	17		14	10	9,11
	10	17,18	13,15	29		
	21			7,9		15,17

TABLE 2

WebCode	Item	D2S1338	D3S1358	D5S818	D7S820	D8S1179	D13S317
		D16S539	D18S51	D19S433	D21S11	Amelogenin	CSF1PO
		FGA	Penta D	Penta E	TH01	TPOX	vWA

## Item 3 major

GVT6AC Identifiler® Plus

3 major	17,25	15,16	11,12	10,12	10,12,13	10,13
	9,11	13,16,18	13,14,15,15.2	30,31.2	X,Y	11,12
	24			6,9,9.3	8,11	16
3 minor	19,20	17		14		9,11
	10	17		29		
	21			7		15,17

HWVCYH PowerPlex®16 (FSA Format)

3			11,12			11,12
3 major		15,16		10,12	12,13	10,13
	9,11	13,16		30,31.2	X,Y	
	24	12	11,15	6,9.3	8,11	16
3 minor		15,17		12,14	10,12	9,11
	10,11	17,18		29,30	X	
	21,24	9,14	5,12	7,9	8,11	15,17

LJEQ4E Identifiler® Plus (PDF Format)

3	17,(19),(20),25	15,16,(17)	11,12	10,12,14	(10),12,13	(9),10,(11),13
	9,(10),11	13,16,(17),(18)	(13),14,(15),(15.2)	(29),30,31.2	X,Y	11,12
	(21),24			6,(7),(9),9.3	8,11	(15),16,(17)
3 major	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24			6,9.3	8,11	16
3 minor	19,20	15,17	11,12	12,14	10,12	9,11
	10,11	17,18	13,15	29,30	X	11,12
	21,24			7,9	8,11	15,17

RK8RA4 Identifiler® Plus

3 major	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24,24			6,9.3	8,11	16,16
3 minor	19,20	15,17	11,12	12,14	10 (12/13)	9,11
	10 (9/11)	17,18	13,15	29,30		11,12
	21,24			7,9	8,11	15,17

TABLE 2

WebCode	Item	D2S1338	D3S1358	D5S818	D7S820	D8S1179	D13S317
		D16S539	D18S51	D19S433	D21S11	Amelogenin	CSF1PO
		FGA	Penta D	Penta E	TH01	TPOX	vWA

## Item 3 major

VYHCK8 Identifiler® Plus

3 major	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24	-	-	6,9,3	8,11	16
3 minor	19,20	15,17	11,12	12,14	10,12	9,11
	10,11	17,18	13,15	29,30	X,X	11,12
	21,24	-	-	7,9	8,11	15,17

XQDEPZ Identifiler® Plus

3 major	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24,24			6,9,3	8,11	16,16
3 minor	19,20	15,17	11,12	12,14	10,12	9,11
	10,11	17,18	13,15	29,30	X,X	11,12
	21,24			7,9	8,11	15,17

TABLE 2

WebCode	Item	D2S1338 D16S539 FGA	D3S1358 D18S51 Penta D	D5S818 D19S433 Penta E	D7S820 D21S11 TH01	D8S1179 Amelogenin TPOX	D13S317 CSF1PO vWA
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## Item 4

2VWGKV Identifiler® Plus (PDF Format)

4	(17),22,23,(25)	15,16	9,11,12	(10),11,(12)	10,(12),13	(10),11,13
	8,(9),10,(11)	(13),(16),17	12,14,(15.2)	30,(31.2),33.3	X,Y	10,(11),12
	(20),24			(6),8,9.3	8,9,(11)	15,16,17
4 major	22,23	15,16	9,11	11	10,13	11,13
	8,10	17	12,14	30,33.3	X,Y	10,12
	20,24			8,9.3	8,9	15,16 or 15,17 or 16,17
4 minor	17,25	15,16; 15,15; or 16,16	11,12	10,12	10,12 or 12,13	10,13
	9,11	13,16	14,15.2	30,31.2	ND	11,12
	24			6,9.3	8,11	17,17 or 16,16 or 15,15

8YHBNP Identifiler® Plus (FSA Format)

4	[REDACTED]					
						15,16,17
4 major	22,23	15,16	9,11	11	10,13	11,13
	8,10	17	12,14	30,33.1	X,Y	10,12
	20,24			8,9.3	8,9	
4 minor	17,25		12	10,12	12	10
	9,11	13,16	15.2	31.2		11
				6	11	

BK6AGN Identifiler® Plus (PDF Format)

4		15,16	9,11,12		10,12,13	
			12,14,15.2		X,Y	10,11,12
	20,24					
4 major	22,23			11		11,13
	8,10	17		30,OL		
				8,9.3	8,9	15,17
4 minor	17,25			10,12		10,13
	9,11	13,16		30,31.2		
				6,9.3	8,11	16

TABLE 2

WebCode	Item	D2S1338 D16S539 FGA	D3S1358 D18S51 Penta D	D5S818 D19S433 Penta E	D7S820 D21S11 TH01	D8S1179 Amelogenin TPOX	D13S317 CSF1PO vWA
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## Item 4

BTFC3P Identifiler® Plus (PDF Format)

4						10,12,13	
		20,24					
4 major		22,23	15,16	9,11	11		11,13
		8,10	17	12,14	30,OL	X,Y	10,12
					8,9,3	8,9	15,17
4 minor		17,25	15,16	11,12	10,12		10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
					6,9,3	8,11	16

CDKHVG Identifiler® Plus (FSA Format)

4		17,22,23,25	15,16	9,11,12	10,11,12	10,12,13	10,11,13
		8,9,10,11	13,16,17	12,14,15.2	30,31.2,33.1	X,Y	10,11,12
		20,24			6,8,9,3	8,9,11	15,16,17

D249GM Identifiler® Plus (FSA Format)

4			15,16				
			-	-			
4 major		22,23		9,11	11	10,13	11,13
		8,10	17	12,14	30,33.1	X,Y	10,12
		20,24	-	-	8,9,3	8,9	15,17
4 minor		17,25		11,12	10,12	12,13	10,13
		9,11	13,16	14,15.2	30,31.2	X,Y	11,12
		24	-	-	6,9,3	8,11	16

D6BFAF Identifiler® Plus (FSA Format)

4		[17],22,23,[25]	15,16	9,11,[12]	[10],11,[12]	10,[12],13	[10],11,13
		8,[9],10,[11]	[13],[16],17	12,14,[15.2]	30,[31.2],33.1	X,Y	10,[11],12
		[20],24			[6],8,9,3	8,9,[11]	15,16,17

EBNYGK Identifiler® Plus (FSA Format)

4		17,22,23,25	15,16	9,11,12	10,11,12	10,12,13	10,11,13
		8,9,10,11	13,16,17	12,14,15.2	30,31.2,OL	X,Y	10,11,12
		20,24	-	-	6,8,9,3	8,9,11	15,16,17

GEWYQG Identifiler® Plus (FSA Format), (PDF Format)

4		17,22,23,25	15,16	9,11,12	10,11,12	10,12,13	10,11,13
		8,9,10,11	13,16,17	12,14,15.2	30,31.2,33.1	X,Y	10,11,12
		20,24			6,8,9,3	8,9,11	15,16,17

TABLE 2

WebCode	Item	D2S1338 D16S539 FGA	D3S1358 D18S51 Penta D	D5S818 D19S433 Penta E	D7S820 D21S11 TH01	D8S1179 Amelogenin TPOX	D13S317 CSF1PO vWA
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## Item 4 major

GVT6AC Identifiler® Plus

4 major	17,22,23,25	15,16	9,11,12	11	10,12,13	11,13
	8,9,10	17	12,14,15.2	30,31.2,33.1	X,Y	10,11,12
	20,24			8,9,3	8,9	15,16,17
4 minor				10,12		10
	11	13,16				
				6	11	

HWVCYH PowerPlex®16 (FSA Format)

4						10,12
4 major		15,16	9,11	11	10,13	11,13
	8,10	17		30,33.1	X,Y	
	20,24	9	17,19	8,9,3	8,9	15,17
4 minor		15,16	11,12	10,12	12,13	10,13
	9,11	13,16		30,31.2	X,Y	
	24	12	11,15	6,9,3	8,11	16

LJEQ4E Identifiler® Plus (PDF Format)

4	(17),22,23,(25)	15,16	9,11,12	(10),11,(12)	10,(12),13	10,11,13
	8,(9),10,(11)	(13),(16),17	12,14,15.2	30,31.2,33.1	X,Y	10,11,12
	20,24			(6),8,9,3	8,9,11	15,16,17
4 major	22,23	15,16	9,11	11	10,13	11,13
	8,10	17	12,14	30,33.1	X,Y	10,12
	20,24			8,9,3	8,9	15,17
4 minor	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24			6,9,3	8,11	16

RK8RA4 Identifiler® Plus (PDF Format)

4	17,22,23,25	15,16	9,11,12	10,11,12	10,12,13	10,11,13
	8,9,10,11	13,16,17	12,14,15.2	30,31.2,R	X,Y	10,11,12
	20,24			6,8,9,3	8,9,11	15,16,17

VYHCK8 Identifiler® Plus

4 major	22,23	15,16	9,11	11	10,13	11,13
	8,10	17	12,14	30,33.1	X,Y	10,12
	20,24	-	-	8,9,3	8,9	15,17
4 minor	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	3,16	14,15.2	30,31.2	X,Y	11,12
	24	-	-	6,9,3	8,11	16



TABLE 2

WebCode	Item	D2S1338	D3S1358	D5S818	D7S820	D8S1179	D13S317
		D16S539	D18S51	D19S433	D21S11	Amelogenin	CSF1PO
		FGA	Penta D	Penta E	TH01	TPOX	vWA

## Item 4 major

XQDEPZ Identifiler® Plus

4 major	22,23	15,16	9,11	11,11	10,13	11,13
	8,10	17,17	12,14	30,33.1	X,Y	10,12
	20,24			8,9.3	8,9	15,17
4 minor	17,25	15,16	11,12	10,12	12,13	10,13
	9,11	13,16	14,15.2	30,31.2	X,Y	11,12
	24,24			6,9.3	8,11	16,16

See Additional Comments (Table 9) for laboratory specific notations.

**YSTR Results**

TABLE 3

WebCode	Item	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393	
		DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533	
		DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4			
<b>Item 1</b>										
2VWGKV	PowerPlex®Y23	1	14	12,13	13	29,30	23	11	13	13
			15,16	12	10,11	19	15	16	24	12
			12	18	19	23	10	11		
BK6AGN	PowerPlex®Y23	1	14	12,13	13	29,30	23	11	13	13
			15,16	12	10,11	19	15	16	24	12
			12	18	19	23	10	11		
BTFC3P	PowerPlex®Y23	1	14	12,13	13	29,30	23	11	13	13
			15,16	12	10,11	19	15	16	24	12
			12	18	19	23	10	11		
CJ4W9L	PowerPlex®Y23	1	14	12,13	13	29,30	23	11	13	13
			15,16	12	10,11	19	15	16	24	12
			12	18	19	23	10	11		
D249GM	Yfiler®	1	14	12,13	13	29,30	23	11	13	13
			15,16	12	10,11	19	15	16	-	-
			-	-	-	23	-	11		
EBNYGK	Yfiler®	1	14	12,13	13	29,30	23	11	13	13
			15,16	12	10,11	19	15	16	-	-
			-	-	-	23	-	11		
GEWYQG	PowerPlex®Y23	1	14	12,13	13	29,30	23	11	13	13
			15,16	12	10,11	19	15	16	24	12
			12	18	19	23	10	11		
H4FF7K	PowerPlex®Y23	1	14	12,13	13	29,30	23	11	13	13
			15,16	12	10,11	19	15	16	24	12
			12	18	19	23	10	11		

TABLE 3

WebCode	Item	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393
		DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533
		DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4		
<b>Item 1</b>									
HWVCYH	PowerPlex®Y23 (FSA Format)								
	1	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
K8Q6KD	PowerPlex®Y23								
	1	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
M2AJPC	PowerPlex®Y23								
	1	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
RK8RA4	PowerPlex®Y23								
	1	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
UXN8Q9	PowerPlex®Y23								
	1	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
VYHCK8	YFiler®								
	1	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	-	-
		-	-	-	23	-	11		
XQDEPZ	YFiler®								
	1	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16		
					23		11		

TABLE 3

WebCode	Item	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393
		DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533
		DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4		
<b>Item 3</b>									
2VWGV	PowerPlex®Y23								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
BK6AGN	PowerPlex®Y23								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
BTFC3P	PowerPlex®Y23								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
CJ4W9L	PowerPlex®Y23 (PDF Format)								
	3 major	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
	3 minor								
		20							
D249GM	Yfiler®								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	-	-
		-	-	-	23	-	11		
EBNYGK	Yfiler®								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	-	-
		-	-	-	23	-	11		
GEWYQG	PowerPlex®Y23								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
H4FF7K	PowerPlex®Y23 (PDF Format)								
	3 major	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		

TABLE 3

WebCode	Item	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393
		DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533
		DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4		
<b>Item 3</b>									
HWVCYH	PowerPlex®Y23 (FSA Format)								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
K8Q6KD									
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
M2AJPC	PowerPlex®Y23 (PDF Format)								
	3 major	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
	3 minor								14 / +1
						16 / +1			RPT
				20 / +1 RPT		RPT			
RK8RA4	PowerPlex®Y23 (PDF Format)								
	3 major	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
UXN8Q9	PowerPlex®Y23								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	24	12
		12	18	19	23	10	11		
VYHCK8	YFiler®								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16	-	-
		-	-	-	23	-	11		
XQDEPZ	YFiler®								
	3	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16		
					23		11		

TABLE 3

WebCode	Item	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393	
		DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533	
		DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4			
<b>Item 4</b>										
2VWGKV	PowerPlex®Y23									
	4	14,15	12,13,14,16	13,14	29,30	23	10,(11)	12,(13)	(13),15	
		14,(15),16	10,12	(10),11	19	14,(15)	16	24	12,13	
		12	18,21	19	22,23	(10),12	11			
BK6AGN	PowerPlex®Y23									
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15	
		14,15,16	10,12	10,11	19	14,15	16	24	12,13	
		12	18,21	19	22,23	10,12	11			
BTFC3P	PowerPlex®Y23									
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15	
		14,15,16	10,12	10,11	19	14,15	16	24	12,13	
		12	18,21	19	22,23	10,12	11			
CJ4W9L	PowerPlex®Y23									
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15	
		14,15,16	10,12	10,11	19	14,15	16	24	12,13	
		12	18,21	19	22,23	10,12	11			
D249GM	YFiler®									
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15	
		14,15,16	10,12	10,11	19	14,15	16	-	-	
		-	-	-	22,23	-	11			
EBNYGK	YFiler®									
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15	
		14,15,16	10,12	10,11	19	14,15	16	-	-	
		-	-	-	22,23	-	11			
GEWYQG	PowerPlex®Y23 (PDF Format)									
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15	
		14,15,16	10,12	10,11	19	14,15	16	24	12,13	
		12	18,21	19	22,23	10,12	11			
H4FF7K	PowerPlex®Y23									
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15	
		14,15,16	10,12	10,11	19	14,15	16	24	12,13	
		12	18,21	19	22,23	10,12	11			

TABLE 3

WebCode	Item	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393
		DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533
		DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4		
<b>Item 4</b>									
HWVCYH	PowerPlex®Y23 (FSA Format)								
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15
		14,15,16	10,12	10,11	19	14,15	16	24	12,13
		12	18,21	19	22,23	10,12	11		
K8Q6KD	PowerPlex®Y23								
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15
		14,15,16	10,12	10,11	19	14,15	16	24	12,13
		12	18,21	19	22,23	10,12	11		
M2AJPC	PowerPlex®Y23								
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15
		14,15,16	10,12	10,11	19	14,15	16	24	12,13
		12	18,21	19	22,23	10,12	11		
RK8RA4	PowerPlex®Y23								
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15
		14,15,16	10,12	10,11	19	14,15	16	24	12,13
		12	18,21	19	22,23	10,12	11		
UXN8Q9	PowerPlex®Y23								
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15
		14,15,16	10,12	10,11	19	14,15	16	24	12,13
		12	18,21	19	22,23	10,12	11		
VYHCK8	YFiler®								
	4	14,15	12,13,14,16	13,14	29,30	23	10,11	12,13	13,15
		14,15,16	10,12	10,11	19	14,15	16	-	-
		-	-	-	22,23	-	11		
XQDEPZ	YFiler®								
	4 major	15	14,16	14	30	23	10	12	15
		14	10	11	19	14	16		
					22		11		
	4 minor	14	12,13	13	29,30	23	11	13	13
		15,16	12	10,11	19	15	16		
					23		11		

## DNA Analysis

Based on the examination of the DNA profiles provided, could the Victim (Item 1) and/or the Suspect (Item 2) be included as a possible contributor to the questioned Item?

TABLE 4

WebCode	<u>Item 3 Conclusion</u>			<u>Item 4 Conclusion</u>		
	<u># of Contributors</u>	<u>Item 1</u>	<u>Item 2</u>	<u># of Contributors</u>	<u>Item 1</u>	<u>Item 2</u>
2VWGVK	2	Included	Included	2	Included	Excluded
8YHBNP	2	Included	Included	2	Included	Excluded
BK6AGN	2	Included	Included	2	Included	Excluded
BTFC3P	2	Included	Included	2	Included	Excluded
CDKHVG	2	Included	Included	2	Included	Excluded
CJ4W9L	possibly 2	Inconclusive/ Uninterpretable	Inconclusive/ Uninterpretable	2	Included	Inconclusive/ Uninterpretable
D249GM	2	Included	Included	2	Included	Excluded
D6BFAF	at least 2	Included	Included	at least 2	Included	Excluded
EBNYGK	2	Included	Included	2	Included	Excluded
GEWYQG	At Least 2	Included	Included	At least 2	Included	Excluded
GVT6AC	2	Included	Included	2	Included	Excluded
H4FF7K	1	Included		at least 2	Included	
HWCYH	2	Included	Included	2	Included	Excluded
K8Q6KD	1	Included	Inconclusive/ Uninterpretable	2	Included	Inconclusive/ Uninterpretable
LJEQ4E	2	Included	Included	At least 2	Included	Excluded
M2AJPC	1, POSS 2	Included	Inconclusive/ Uninterpretable	2	Included	Inconclusive/ Uninterpretable
RK8RA4	2 (1 male + 1 female)	Included	Included	2 males	Included	Excluded
UXN8Q9	1	Included		2	Included	



TABLE 4

<b>WebCode</b>	<b># of Contributors</b>	<b><u>Item 3 Conclusion</u></b>		<b><u>Item 4 Conclusion</u></b>		
		<b><u>Item 1</u></b>	<b><u>Item 2</u></b>	<b><u># of Contributors</u></b>	<b><u>Item 1</u></b>	<b><u>Item 2</u></b>
VYHCK8	2	Included	Included	2	Included	Excluded
XQDEPZ	2	Included	Included	2	Included	Excluded

<b>Response Summary</b>		<b>Participants reporting conclusions: 20</b>			
<i>Based on the examination of the DNA profiles provided, could the Victim (Item 1) and/or the Suspect (Item 2) be included as a possible contributor to the questioned Item?</i>					
<b>Responses</b>		<b><u>Item 3</u></b>		<b><u>Item 4</u></b>	
		<b><u>Item 1</u></b>	<b><u>Item 2</u></b>	<b><u>Item 1</u></b>	<b><u>Item 2</u></b>
	Included	<b>19</b>	<b>15</b>	<b>20</b>	<b>0</b>
	Excluded	<b>0</b>	<b>0</b>	<b>0</b>	<b>15</b>
	Inconclusive	<b>1</b>	<b>3</b>	<b>0</b>	<b>3</b>

# Statistical Analysis of Item 3

TABLE 5

WebCode	Item 3 Methods	Item 3 Results
2VWGKV	Random Match Probability	1 in 38 quadrillion. Statistics were calculated using all loci and the most conservative result was reported.
8YHBNP	Likelihood Ratio, Random Match Probability	RMP for Major = 1 in 1.2 quintillion. RMP for Minor = 1 in 55 million. LR for profile based on VIC (Item 1) & SUS (Item 2) vs. 2 unknown, unrelated individuals = 15 sextillion. LR for profile based on VIC (Item 1) & one unknown indiv. vs. 2 unknown, unrelated indivs. = 47 million. LR for profile based on SUS (Item 2) & one unknown indiv. vs. 2 unknown, unrelated indivs. = 2.8 billion.
BK6AGN		No statistical analysis performed
BTFC3P		No statistical calculations performed.
CDKHVG	Likelihood Ratio	A mixed DNA profile was obtained from Item 3, the sample from the suspect's shirt. This DNA profile is consistent with the combined known profiles from the victim (Item #1) and the suspect (Item #2). It is 16 trillion times more likely that the observed DNA profile occurred as a result of a mixture of the victim and suspect than it having originated from the suspect and an unrelated individual selected at random from the [country] population.
CJ4W9L	Likelihood Ratio	The profile has not been seen in a Western European database of 23,667 Y-STR profiles, indicating that the profile obtained is rare. In my opinion, a reasonable estimate for the frequency of occurrence for the Y-STR profile in a Western European population is approximately 1 in 11,000 unrelated individuals.
D249GM	Likelihood Ratio	The probability of a randomly selected unrelated individual having a DNA profile that is consistent with being one of the contributor to the mixed DNA profile (given that the known contributor is represented by Item 2) is approximately : 1) 1 in 900 trillion as calculated based on [country] Malay population database. 2) 1 in 6.6 quadrillion as calculated based on [country] Chinese population database. 3) 1 in 420 trillion as calculated based on [country] Indian population database.
D6BFAF	Combined Probability of Exclusion/Inclusion, Random Match Probability	RMP - The victim is included as a source of the major component of the DNA mixture detected in item 3. The probability of randomly selecting an unrelated individual who would be included as a source of the major component of the DNA mixture detected in this sample is 1 in 18.28 quadrillion in the African American population, 1 in 484.7 trillion in the Caucasian population and 1 in 195.6 trillion in the Hispanic population. CPI - The victim and the suspect are included as contributors to the DNA mixture detected in item 3. The probability of randomly selecting an unrelated individual who would be included as a contributor to the DNA mixture detected in this sample is 1 in 16.15 million in the African American population, 1 in 1.815 million in the Caucasian population and 1 in 1.745 million in the Hispanic population.

TABLE 5

WebCode	Item 3 Methods	Item 3 Results
EBNYGK	Combined Probability of Exclusion/Inclusion	Combined PI : 8.3 E-9 (For [country] Malay Population) Combined PI : 2.9 E-8 (For [country] Chinese Population)
GEWYQG	Random Match Probability	Re. Identifiler Plus: If the DNA detected within the major portion of this result had originated from someone other than and unrelated to the male victim, it is estimated that the chance of obtaining these matching profiles is in the order of 1 in a billion (a thousand million). No statistical analysis conducted re. Suspect as sample was taken from her shirt, so the presence of DNA attributable to her is not unexpected. Re. Powerplex Y23: Statistical Analysis: Haplotype frequency estimation. Item 1 Conclusion: Item 1 (victim) is included (cannot be excluded) as a possible contributor to the DNA obtained from Item 3. Item 2 Conclusion: N/A as suspect is female and therefore no Y-STR analysis conducted on her reference sample. As an indication of how common the Y-STR profile is, I have used the full Y-STR profile to carry out a search of a global database of Y-STR profiles and observed no matching profiles in a database of 23,667 profiles from Western European males (search carried out on 26/5/16 using YHRD Release 51). In my opinion a reasonable estimate of the frequency of occurrence of this Y-STR profile in the Western European male population is approximately 1 in 11,000 unrelated males (pseudocounting method used: $n+2/N+2$ ).
GVT6AC	Combined Probability of Exclusion/Inclusion	Using the most conservative frequency estimate (Southwest Hispanic) calculated, approximately 271,400 unrelated individuals would have to be evaluated before expecting to find an individual that would have a DNA profile that cannot be excluded as a possible contributor to this item of evidence.
H4FF7K	adjusted frequency	$n+2/N+2$ estimate derived from search of YHRD. Convert numerical estimate into a strength of support for source, using a corporate verbal scale.
HWVCYH	Random Match Probability	A major male and a minor female contributor were obtained from all but two loci; D5S818 and CSF1PO. The probability of selecting a random unrelated individual having a DNA profile identical to the major contributor at the loci observed is 1 in 3.28E20 for African Americans, 1 in 2.31E18 for Caucasian, 1 in 3.59 E17 for Hispanics, and 1 in 4.36E20 for Asian. The probability of selecting a random unrelated individual having a DNA profile identical to the minor contributor at the loci observed is 1 in 6.79E19 for African Americans, 1 in 1.41E18 for Caucasian, 1 in 3.34E17 for Hispanic, and 1 in 5.97E18 for Asian.
K8Q6KD	Random Match Probability	To assess the evidential significance of this result, the Y-STR profile obtained has been compared with certain profiles held on the Y-STR database. In my opinion, the results of this comparison show that a reasonable estimate for the frequency of occurrence of this Y-STR profile within a relevant population is 1 in 11,000.

TABLE 5

WebCode	Item 3 Methods	Item 3 Results
LJEQ4E	Combined Probability of Exclusion/Inclusion, Random Match Probability	The DNA profile obtained from evidence item #3 Questioned stain from suspect shirt is consistent with a mix DNA profile with a distinguishable major component from the victim and a minor component from the suspect. The chances of selecting an unrelated individual that would be included in the mixed profile at 15 of 15 tested loci is approximately: 1 in 2.41 million individuals in the Caucasian Population 1 in 16.8 million individuals in the African American Population 1 in 1.20 million individuals in the South East Hispanic Population 1 in 454 thousand individuals in the South West Hispanic Population. The chances of selecting an unrelated individual from the mixed profile with a minor component that would be included in the mix profile at the 15 of 15 tested loci is approximately: 1 in 2.41 million individuals in the Caucasian Population 1 in 151 Quadrillion individuals in the African American Population 1 in 6.26 quadrillion individuals in the South East Hispanic Population 1 in 4.03 quadrillion individuals in the South West Hispanic Population.
M2AJPC	$n+2/N+2$	Within the result there was a full major Y-STR DNA profile which matched the corresponding components in the Y-STR DNA profile of VICTIM, as such there is male DNA within the sample that could have originated from him, or someone with the same male lineage. To assess the evidential significance of this match, the Y-STR profile obtained has been compared with certain profiles held on a Y-STR database*. In my opinion, the results of this comparison show that a reasonable estimate for the frequency of occurrence for the Y-STR profile within a Western European population is 1 in 11,000. There were a few possible additional minor DNA components which were insufficient for any meaningful comparison and do not affect my interpretation of the major Y-STR profile.
RK8RA4	Likelihood Ratio, Random Match Probability	Match to suspect not statistically appraised as it is her shirt and it seems fair to assume her presence. Source level: The DNA profiling result is in the order of one billion times more likely if the blood on the shirt came from the victim rather than an unknown male unrelated to him (ie assumption that major is equivalent to the blood). Sub-source level: The DNA profiling result is in the order of one billion times more likely if the DNA came from the suspect and the victim rather than the suspect and an unknown male unrelated to the victim.
UXN8Q9	Frequency estimate	No matching (Y-Filer) profiles were found in the YHRD database for the Western European population. The profile can therefore be considered as rare. It is conservatively estimated that one might expect to find this Y-STR profile in one in 11,000 males in Western Europe.
VYHCK8	Random Match Probability	1. The probability of randomly selected unrelated individual having this matching DNA profile (major contributor) is approximately 1 in 5.3 quintillion, 1 in 27 quintillion and 1 in 1.8 quintillion as calculated based on the [country] Malay, Chinese and Indian population database respectively. 2. The probability of randomly selected unrelated individual having this matching DNA profile (minor contributor) is approximately 1 in 7.5 quintillion, 1 in 990 quadrillion and 1 in 2.5 quintillion as calculated based on the [country] Malay, Chinese and Indian population database respectively.

TABLE 5

WebCode	Item 3 Methods	Item 3 Results
XQDEPZ	Likelihood Ratio	LR = H1 [Mixture of Item 1 (Victim) and Item 2 (suspect)]/H2 [Mixture of two unknown unrelated people] LR = H1/H2 = 1/2,2477E-37 = 4,449E+36 Hypothesis 1 (H1) is 4,449E+36 times more likely hypothesis 2 (H2).

# Statistical Analysis of Item 4

TABLE 6

WebCode	Item 4 Methods	Item 4 Results
2VWGV	Random Match Probability	1 in 93 trillion Statistics were calculated using all loci except D8S1179, D3S1358, and vWA and most conservative result was reported.
8YHBNP	Likelihood Ratio, Random Match Probability	RMP for Major = 1 in 2.2 sextillion RMP for Minor = 1 in 230 thousand LR for profile based on VIC (Item 1) & one unknown indiv. vs. 2 unknown, unrelated individuals = 83 million.
BK6AGN		No statistical analysis performed
BTFC3P		No statistical calculations performed
CDKHVG	Likelihood Ratio	A mixed DNA profile was obtained from Item 4, the sample from the floor at the crime scene. This DNA profile is consistent with the known profile from the victim (Item #1) and an unknown individual. It is 110 million times more likely that the observed DNA profile occurred as a result of a mixture of the victim and an unknown individual than it having originated from two unknown individuals selected at random from the [country] population.
CJ4W9L		In my opinion, this YSTR result cannot be reliably separated into the profiles of the individual contributors and as such is not suitable for statistical evaluation.
D249GM	Likelihood Ratio	The probability of a randomly selected unrelated individual having a DNA profile (with the source represented by Item 1) is consistent with being one of the contributor is approximately: 1) 1 in 10 billion as calculated based on [country] Malay population database. 2) 1 in 57 billion as calculated based on [country] Chinese population database. 3) 1 in 2.4 billion as calculated based on [country] Indian population database.
D6BFAF	Combined Probability of Exclusion/Inclusion	The victim is included as a contributor to the DNA mixture detected in item 4. The probability of randomly selecting an unrelated individual who would be included as a contributor to the DNA mixture detected in this sample is 1 in 56.75 million in the African American population, 1 in 6.993 million in the Caucasian population and 1 in 5.770 million in the Hispanic population.
EBNYGK	Combined Probability of Exclusion/Inclusion	Combined PI : 7.5 E-11 ([country] Malay Population) Combined PI : 2.3 E-10 ([country] Chinese Population)

TABLE 6

WebCode	Item 4 Methods	Item 4 Results
GEWYQG	Likelihood Ratio	Re: Identifiler Plus. Hp: The result comprises DNA from the male victim and one other unknown individual, or Hd: The result comprises DNA from two unknown individuals. (For the purpose of the calculation it is assumed that all individuals are unrelated and that the victim is Caucasian). I have calculated the result to be approximately 2.3 million (2,300,000) times more likely if the former is true rather than the latter. Re: Powerplex Y23. Item 1 conclusion: Item 1 is included (cannot be excluded) as a possible contributor to the male DNA obtained from Item 4. Item 2 conclusion: N/A (suspect is female). Statistical evaluation: No statistical evaluation of mixed Y-STR profiles currently being carried out at the laboratory.
GVT6AC		No statistic calculated based on the scenario. Statistic would be calculated if and when a possible contributor, other than the victim, is identified.
H4FF7K	Qualitative	Would give opinion on inclusion as possible contributor, that it's unlikely to see a full match to a Y23 profile in a 2 person mixture by chance alone, if they had not contributed. Discuss with customer whether more elaboration was required. If so would ascertain whether it was possible to use conditioning information; could then calculate a figure for the remainder using YHRD. If this was not possible I would consider the rarity of the matching components and make a qualitative assessment. The finding of duplicated loci would in this instance, provide stronger support for inclusion of the suspect.
HWVCYH	Random Match Probability	A major male and a minor male contributor were obtained from all but one loci; CSF1PO, The probability of selecting a random unrelated individual having a DNA profile identical to the major contributor at the loci observed is 1 in 7.48E22 for African American, 1 in 1.21E22 for Caucasian, 1 in 1.03E21 for Hispanics, and 1 in 7.03E21 for Asian. The probability of selecting a random unrelated individual having a DNA profile identical to the minor contributor at the loci observed is 1 in 4.59E19 for African Americans, 1 in 4.04E17 for Caucasian, 1 in 7.15E16 for Hispanics, and 1 in 9.34E19 for Asian.
K8Q6KD		On the basis of one run only and in the absence of a conditioning profile, unable to reliably separate into component profiles (appears approx. 1:1 at some areas). Therefore, no statistical evaluation carried out.
M2AJPC		In my opinion VICTIM and one other male could have contributed DNA to this result however it is not possible to carry out a statistical interpretation of this mixed result in relation to VICTIM.

TABLE 6

WebCode	Item 4 Methods	Item 4 Results
RK8RA4	Likelihood Ratio, None performed at present	As it is the victim's house, no statistic has been performed for the support that his DNA has been detected. However, if it were to be assumed that his DNA was present, incomplete autosomal and Y profiles could be determined which would be suitable for comparison with reference samples or a DB search. If a match was found with a named individual could do a LR calc of (Victim + Named individual) / (Victim + [country] male unrelated to named individual).
UXN8Q9		Not suitable for further evaluation without use of conditioning information
VYHCK8	Random Match Probability	The probability of randomly selected unrelated individual having this matching DNA profile (minor contributor) is approximately 1 in 5.3 quintillion, 1 in 27 quintillion and 1 in 1.8 quintillion as calculated based on the [country] Malay, Chinese and Indian population database respectively.
XQDEPZ	Likelihood Ratio	LR = H1 [Mixture of Item 1 (Victim) and one unknown unrelated person]/H2 [Mixture of two unknown unrelated people] LR = H1/H2 = 4,59E-23/1,2037E-40 = 3,813E+17 Hypothesis 1 (H1) is 3,813E+17 times more likely hypothesis 2 (H2). A major contributor can be deducted.



# Databases Used

TABLE 7

WebCode	Databases Used
2VWGKV	Item 3: Autosomal statistics were calculated using the African American, Caucasian, and Hispanic databases published in the NIST 1036 Allele Frequency Dataset (Hill et al. Forensic Science International: Genetics 7 (2013) e82-e83). Item 4: Autosomal statistics were calculated using the African American, Caucasian, and Hispanic databases published in the NIST 1036 Allele Frequency Dataset (Hill et al. Forensic Science International: Genetics 7 (2013) e82-e83).
8YHBNP	Item 3: RMPs - FBI Caucasian. LRs - NIST 1036 Caucasian. Item 4: RMPs - FBI Caucasian. LRs - NIST 1036 Caucasian.
BTFC3P	Item 3: n/a Item 4: n/a
CDKHVG	Item 3: FBI Amended 2015, BLK, CAU, SWH Item 4: FBI Amended 2015, BLK, CAU, SWH
CJ4W9L	Item 3: * YHRD Database - Willuweit S., Roewer L. (2007) 'Y chromosome haplotype reference database (YHRD): Update', Forensic Science International: Genetics 1(2), 83-7. Release 51. Item 4: N/A
D249GM	Item 3: 1) [country] Malay population database. 2) [country] Chinese population database. 3) [country] Indian population database. Item 4: 1) [country] Malay population database. 2) [country] Chinese population database. 3) [country] Indian population database.
D6BFAF	Item 3: [State] Police Database Item 4: [State] Police Database
EBNYGK	Item 3: STR allele frequencies for 15 STR loci for [country] Malay Population and STR allele frequencies for 15 STR loci for [country] Chinese Population Item 4: STR allele frequencies for 15 STR loci for [country] Malay Population and STR allele frequencies for 15 STR loci for [country] Chinese Population.
GEWYQG	Item 3: For Identifiler Plus - N/A as Match Probability estimated (but allele frequency database used indirectly). For Powerplex Y23 - YHRD (Y-STR Haplotype Reference Database). Item 4: [Laboratory] allele frequency database (Identifiler)
GVT6AC	Item 3: CODIS POPSTATS v. 7.0 (theta: 0.03), JFS 2001:46;(3):453-489, 2015 JFS Erratum doi: 10.1111/1556-4029.12806
H4FF7K	Item 3: YHRD Western European dataset, typically use Y23 data since its the largest dataset. Item 4: May use YHRD
HWCYH	Item 3: Promega Item 4: Promega
K8Q6KD	Item 3: YHRD database, release 51 Item 4: N/A
LJEQ4E	Item 3: Popstats Item 4: N/A
M2AJPC	Item 3: YHRD R51 20146-02-17

TABLE 7

WebCode	Databases Used
RK8RA4	Item 3: Ceiling figure of one billion used as per standard [country] reporting. As such, no data consulted. (For interest, no matches found to Y profile in Worldwide DB of 26,869 samples - YHRD.com Version R51) Item 4: None
UXN8Q9	Item 3: YHRD R51 (Willuweit & Roewer)
VYHCK8	Item 3: 1. [country] Malay population database. 2. [country] Chinese population database. 3. [country] Indian population database. Item 4: 1. [country] Malay population database. 2. [country] Chinese population database. 3. [country] Indian population database.
XQDEPZ	Item 3: The calculations were made with GeneMapper ID X, using a personal [country] caucasian database. Item 4: The calculations were made with GeneMapper ID X, using a personal [country] caucasian database.

## Amplification Kit Survey

Please list all PCR amplification kits (Autosomal and YSTR) utilized as well as any future kits to be implemented in your laboratory.

TABLE 8

WebCode	Amplification Kit
BK6AGN	Identifiler Plus, Powerplex Y23, GlobalFiler
BTFC3P	Current/Future Identifiler Plus PowerPlexY23 Globalfiler Express
CDKHVG	Identifiler Plus and Yfiler at present. PowerPlex Fusion 6C and Y23 in future.
D6BFAF	Current - PP16, PP16 HS Yfiler analysis only - Identifiler Plus + MiniFiler. Future - GlobalFiler, GlobalFiler Express, Yfiler Plus.
EBNYGK	PowerPlex Fusion, Identifiler Plus, Identifiler Direct, Y-filer
GEWYQG	The main PCR kits in our forensic operation are NGM Select and Powerplex 23.
M2AJPC	Powerplex Y23
RK8RA4	As defence scientists we review a wide range of kits results.
UXN8Q9	DNA-17 (ESI Fast) & occasionally NGM Select. Powerplex Y23.

# Additional Comments

## TABLE 9

WebCode	Additional Comments
8YHBNP	I wasn't completely sure whether reporting language was expected in Section 3 for Items 3, and 4, but here are generic examples: For RMPs: "The estimated probability of selecting an unrelated individual, at random, from the [country] Caucasian population with a matching DNA profile is 1 in X." For LR: "It is estimated to be X times more likely to observe the mixed DNA profile obtained from Item 3 if the two contributors were VIC (Item 1) and SUS (Item 2) than if the contributors were two unknown, unrelated individuals selected at random from the [country] Caucasian population."
BK6AGN	Interpretations for databasing purposes only
BTFC3P	Interpretations for databasing purposes only.
CDKHVG	A note about off ladder alleles: Our casework SOP requires that an off ladder allele that has been previously reported to NIST must be re-injected before it can be renamed. Sample 4 with the 33.1 allele at D21 was not re-injected but for the purposes of this proficiency was renamed despite this.
D249GM	a) OL allele was detected at D21S11 for Item 4. This OL allele was designated as allele 33.1 after base pair calculation. b) The DNA profile of Item 3 indicated a mixed DNA profile of two contributors. The DNA profile represented by Item 1 and Item 2 are consistent with being the contributors to this mixed DNA profile. The probability of a randomly selected unrelated individual having a DNA profile that is consistent with being one of the contributor to the mixed DNA profile (given that the known contributor is represented by Item 2) is approximately : 1) 1 in 900 trillion as calculated based on [country] Malay population database. 2) 1 in 6.6 quadrillion as calculated based on [country] Chinese population database. 3) 1 in 420 trillion as calculated based on [country] Indian population database. c) The DNA profile of Item 4 indicated a mixed DNA profile of two male contributors. The DNA profile represented by Item 1 is consistent with being one the contributors to this mixed DNA profile. The probability of a randomly selected unrelated individual having a DNA profile (with the source represented by Item 1) is consistent with being one of the contributor is approximately : 1) 1 in 10 billion as calculated based on [country] Malay population database. 2) 1 in 57 billion as calculated based on [country] Chinese population database. 3) 1 in 2.4 billion as calculated based on [country] Indian population database. d) The statistical calculation was done using the DNA -View Software Ver 34.22
D6BFAF	Item 3 conclusion note: Our policy requires a source attribution statement if the random match statistic is greater than 7.1 trillion. The conclusion would read: "The major component of the DNA mixture detected in item 3 matches the DNA profile obtained from the victim. To a reasonable degree of scientific certainty, and excluding an identical twin, the victim is the source of the major component of the DNA mixture detected in this sample." Item 4 conclusion note: The major component of the DNA mixture detected in item 4 originates from an unknown male. The victim is included as a contributor in the minor component alleles. Major/minor components could not be determined at the vWA and FGA loci. Note for item 3 and 4: The D2S1338 and D19S433 loci were not used in the statistical analysis because the database used does not contain allele frequency information for these loci. [ ] in DNA analysis results indicates a lighter intensity allele.
GEWYQG	[From Part 1, DNA Analysis - Instructions] NB. Neither Identifiler Plus nor Powerplex 16 routinely used by [Laboratory] (in casework), therefore generic values below used. [From Part 1, Item 4] .fsa format used to calculate rare allele at D21. No ethnicity of the victim was provided for the calculations so used a Caucasian allele frequency database.
M2AJPC	Apparent duplication event affecting 3 loci seen in results from VICTIM and item 3 major - this is also observed within the mixture from item 4 indicating that the same haplotype has indeed contributed to the result. However unless a conditioning profile were provided for item 4 it is not possible to carry out an $n+2/N+2$ statistical interpretation.

TABLE 9

WebCode	Additional Comments
RK8RA4	My interpretations have taken into account the case circumstances and the nature of the staining. This has reduced the need for statistical calculations, but I am of the opinion that both of the casework profiles would have been suitable for evaluation if the need arose. Where a mixture could not be entirely separated into major/minor, no separation has been recorded (even if some loci could be split). (Some concern that ref samples appear to have been analysed at same time as crime stains).
UXN8Q9	If it is assumed that the victim contributed his DNA to the result from item 4, the almost full Y23 profile of an unknown male can be determined. I did not undertake any autosomal testing as part of the trial, therefore I am unable to comment upon whether or not any of these samples include DNA from the female suspect.
VYHCK8	- Item 4 at D21S11, OL allele was designated as allele 33.1 based on the calculation done. - The AT and ST for STR analysis are based on GeneMapper ID-X and GA 3500xL.
XQDEPZ	The Laboratory uses Identifiler and PowerPlex16HS for reference and only Identifiler for trace. The Laboratory uses YFiler for reference and trace.

# **Appendix: Data Sheet**

Collaborative Testing Services ~ Forensic Testing Program

## **Test No. 16-588: DNA Interpretation**

DATA MUST BE RECEIVED BY June 6, 2016 TO BE INCLUDED IN THE REPORT

Participant Code:

WebCode:

### **Accreditation Release Statement**

CTS submits external proficiency test data directly to ASCLD/LAB, ANAB, and 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 on the last page must be completed and submitted.)
- This participant's data is **NOT** intended for submission to ASCLD/LAB, ANAB or A2LA.

#### **Scenario:**

The victim was assaulted and incapacitated with a blunt object in the bedroom of his apartment. A female seen fleeing from the building was apprehended by the police as a suspect in the attack, and her shirt contained a visible red stain which was collected as evidence (Item 3). The processing of the crime scene revealed a blood drop on the floor close to the front door, which was collected as evidence (Item 4). The Serology unit reported that only blood was found on the evidence items. The DNA unit has completely consumed all evidence items and has provided you with DNA profiles obtained from the items. You are requested to evaluate the DNA profiles using your laboratory specific analysis guidelines and report interpretations and statistical results.

**Both .fsa and .pdf formats are provided for use in this test, choose one or both formats for evaluation.**

#### **Items Submitted (Sample Pack INT1):**

- Item 1: DNA profile from reference sample (Male Victim)
- Item 2: DNA profile from reference sample (Female Suspect)
- Item 3: DNA profile from questioned blood stain from suspect's shirt
- Item 4: DNA profile from questioned blood stain from the floor of the crime scene

**Please return all pages of this data sheet.**

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**Part I: DNA ANALYSIS INSTRUCTIONS**

\* Use your laboratory's Interpretation guidelines for evaluation of this test.

Please report Laboratory Specific Interpretation Guidelines below per amplification kit.

Analytical Threshold: \_\_\_\_\_

Peak Height Ratio (%): \_\_\_\_\_

Stochastic Threshold (Peak Amplitude): \_\_\_\_\_

**If you do not have Interpretation guidelines, please use the following guidelines and report these values above:**

For STR Analysis: Analytical Threshold: 75 rfu, Peak Height Ratio: 60%, Stochastic Threshold (Peak Amplitude): 50 rfu

For YSTR Analysis: Analytical Threshold: 75 rfu, Peak Height Ratio: 50%, Stochastic Threshold (Peak Amplitude): 75 rfu

**!!! IMPORTANT NOTE !!!**

If you opt to analyze the .FSA files for Identifiler Plus, please note that you must change your analysis settings for the LIZ GS500 size standard to ignore the 250 and 340 bp peaks.

If you opt to analyze the .FSA files for Yfiler, please note that you must change your analysis settings for the LIZ GS500 size standard to ignore the 250 bp peak.

- \* Report the allelic results for each Item in the appropriate response boxes.
- \* Report alleles in numerical order, separated by a comma.
- \* If a major and minor contributor can be distinguished and your laboratory normally reports this distinction, report the results of the major profile and the minor profile in the appropriately labeled boxes; otherwise, list the alleles in numerical order in the remaining boxes that is only labeled with the Item number.
- \* Please Note: Samples were completely consumed during extraction.

<b>Example</b>	D2S1338	D3S1358	D5S818	D7S820	D8S1179	D13S317
<b>3</b>	14,15,16			6,10,11		
Major		12,13	12		14	8,11
Minor		14,15	12,17		18,19	12,13

**Part I: DNA ANALYSIS**

**STR & Amelogenin Results for Known Item 1**

**STR Amplification Kit Used:** Please indicate the electropherogram(s) reviewed for this test.

Identifiler® Plus       PowerPlex® 16       .fsa format       .pdf format

ITEM	D2S1338	D3S1358	D5S818	D7S820	D8S1179	D13S317
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEM	D16S539	D18S51	D19S433	D21S11	Amelogenin	CSF1PO
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEM	FGA	Penta D	Penta E	TH01	TPOX	vWA
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**YSTR Results for Known Item 1**

**YSTR Amplification Kit Used:** Please indicate the electropherogram(s) reviewed for this test.

YFiler®       PowerPlex® Y23       .fsa format       .pdf format

ITEM	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEM	DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ITEM	DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**Part I: DNA ANALYSIS (continued)**

**STR & Amelogenin Results for Known Item 2**

<b>STR Amplification Kit Used:</b> Please indicate the electropherogram(s) reviewed for this test.					
<input type="checkbox"/> Identifiler® Plus	<input type="checkbox"/> PowerPlex® 16	<input type="checkbox"/> .fsa format	<input type="checkbox"/> .pdf format		

<b>ITEM</b>	D2S1338	D3S1358	D5S818	D7S820	D8S1179	D13S317
<b>2</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>ITEM</b>	D16S539	D18S51	D19S433	D21S11	Amelogenin	CSF1PO
<b>2</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>ITEM</b>	FGA	Penta D	Penta E	TH01	TPOX	vWA
<b>2</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**YSTR Results for Known Item 2**

<b>YSTR Amplification Kit Used:</b> Please indicate the electropherogram(s) reviewed for this test.							
<input type="checkbox"/> Yfiler®	<input type="checkbox"/> PowerPlex® Y23	<input type="checkbox"/> .fsa format	<input type="checkbox"/> .pdf format				

<b>ITEM</b>	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393
<b>2</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>ITEM</b>	DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533
<b>2</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

<b>ITEM</b>	DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4
<b>2</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Please return all pages of this data sheet.**

**Part I: DNA ANALYSIS (continued)**

**STR & Amelogenin Results for Questioned Item 3**

**STR Amplification Kit Used:** Please indicate the electropherogram(s) reviewed for this test.  
 Identifiler® Plus       PowerPlex® 16       .fsa format       .pdf format

ITEM	D2S1338	D3S1358	D5S818	D7S820	D8S1179	D13S317
<b>3</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ITEM	D16S539	D18S51	D19S433	D21S11	Amelogenin	CSF1PO
<b>3</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ITEM	FGA	Penta D	Penta E	TH01	TPOX	vWA
<b>3</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**YSTR Results for Questioned Item 3**

**YSTR Amplification Kit Used:** Please indicate the electropherogram(s) reviewed for this test.  
 Yfiler®       PowerPlex® Y23       .fsa format       .pdf format

ITEM	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393
<b>3</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ITEM	DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533
<b>3</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ITEM	DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4
<b>3</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Please return all pages of this data sheet.

**Part I: DNA ANALYSIS (continued)**

**Item 3 DNA Analysis Questions**

1) Record the number of contributors found in the Item 3 DNA profile: \_\_\_\_\_

2) Choose the conclusion statement that best describes the results of the analysis for Item 3 based on comparisons with the Known Items (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 the Additional Comments section.):

**Item 1 Conclusion**

- Item 1 (victim) is included (cannot be excluded) as a possible contributor to the DNA obtained from Item 3.
- Item 1 (victim) is excluded as a possible contributor to the DNA obtained from Item 3.
- The DNA typing results for Item 3 in comparison with Item 1 are inconclusive/uninterpretable.

**Item 2 Conclusion**

- Item 2 (suspect) is included (cannot be excluded) as a possible contributor to the DNA obtained from Item 3.
- Item 2 (suspect) is excluded as a possible contributor to the DNA obtained from Item 3.
- The DNA typing results for Item 3 in comparison with Item 2 are inconclusive/uninterpretable.

**3) Statistical Analysis of Item 3 DNA Typing Results:**

Select the statistical method(s) used by marking the associated box and report these results in the space below:

- Combined Probability of Exclusion/Inclusions (CPE/CPI)
- Likelihood Ratio (LR)
- Random Match Probability (RMP)
- Other: \_\_\_\_\_

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4) Please list any databases used in the statistical analyses of Item 3 below.

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**Part I: DNA ANALYSIS (continued)**

**STR & Amelogenin Results for Questioned Item 4**

**STR Amplification Kit Used:** Please indicate the electropherogram(s) reviewed for this test.  
 Identifiler® Plus       PowerPlex® 16       .fsa format       .pdf format

ITEM	D2S1338	D3S1358	D5S818	D7S820	D8S1179	D13S317
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ITEM	D16S539	D18S51	D19S433	D21S11	Amelogenin	CSF1PO
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ITEM	FGA	Penta D	Penta E	TH01	TPOX	vWA
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**YSTR Results for Questioned Item 4**

**YSTR Amplification Kit Used:** Please indicate the electropherogram(s) reviewed for this test.  
 YFiler®       PowerPlex® Y23       .fsa format       .pdf format

ITEM	DYS19	DYS385	DYS389-I	DYS389-II	DYS390	DYS391	DYS392	DYS393
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ITEM	DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	DYS481	DYS533
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

ITEM	DYS549	DYS570	DYS576	DYS635	DYS643	Y GATA H4
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
major	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
minor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Please return all pages of this data sheet.



**Part II: ADDITIONAL COMMENTS**

Comments regarding any part of this test.

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**Part III: AMPLIFICATION KIT SURVEY (optional)**

To accommodate your laboratory's future needs, please list all PCR amplification kits (Autosomal and YSTR) utilized as well as any future kits to be implemented in your laboratory.

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<p><b>Return Instructions:</b> Data must be received via online data entry, fax (please include a cover sheet), or mail by <i>June 06, 2016</i> to be included in the report. Emailed data sheets are not accepted.</p>	<p>Participant Code:</p> <p>ONLINE DATA ENTRY: <a href="http://www.cts-portal.com">www.cts-portal.com</a></p> <p>FAX: +1-571-434-1937</p> <p>MAIL: Collaborative Testing Services, Inc. P.O. Box 650820 Sterling, VA 20165-0820 USA</p>
<p>QUESTIONS?</p> <p>TEL: +1-571-434-1925 (8 am - 4:30 pm EST)</p> <p>EMAIL: <a href="mailto:forensics@cts-interlab.com">forensics@cts-interlab.com</a> <a href="http://www.ctsforensics.com">www.ctsforensics.com</a></p>	

**Please return all pages of this data sheet.** Page 9 of 10

Collaborative Testing Services ~ Forensic Testing Program

**RELEASE OF DATA TO ACCREDITATION BODIES**

The following Accreditation Releases will apply only to:

Participant Code: \_\_\_\_\_ WebCode: \_\_\_\_\_

for Test No. **16-588: DNA Interpretation**

This release page must be completed and received by **June 6, 2016** to have this participant's submitted data included in the reports forwarded to the respective Accreditation Bodies.

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**

**ASCLD/LAB** Certificate No. \_\_\_\_\_

**ANAB** Certificate No. \_\_\_\_\_

**A2LA** Certificate No. \_\_\_\_\_

**Step 2: Complete the Laboratory Identifying Information in its entirety**

Signature and Title \_\_\_\_\_

Laboratory Name \_\_\_\_\_

Location (City/State) \_\_\_\_\_

<b>Accreditation Release</b>	
<p><b><u>Return Instructions</u></b></p> <p><i>Please submit the completed Accreditation Release at the same time as your full data sheet. See Data Sheet Return Instructions on the previous page.</i></p>	<p><i>Questions? Contact us 8 am-4:30 pm EST</i></p> <p>Telephone: +1-571-434-1925</p> <p>email: forensics@cts-interlab.com</p>

**Please return all pages of this data sheet.**

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