

considered 47, unacceptable product size 41, primer in pair overlaps a primer in a better pair 140, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR 11E44-04-08

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	88	20	58.90	50.00	0.00	0.00	0.00	CAATGCCATTGCGCTCGAA
RIGHT PRIMER	492	20	59.47	55.00	0.00	0.00	0.00	TTGGCTGTAGTGCGGTAGAG

SEQUENCE SIZE: 503
INCLUDED REGION SIZE: 503

PRODUCT SIZE: 405, PAIR ANY_TH COMPL: 9.60, PAIR 3'_TH COMPL: 5.38

```
1 TCGGCCTTTGGCCGGGAGCTCTGCAACTCCGTCAAGCATGAAGTCCTTCTCTCTTTGTT
61 TGCTGTGTTCTCTCTCTCTCTCAGGTCAATGCCATTGCGCTCGAAAGGTAGAGAACCG
    >>>>>>>>>>>>>>>>>>>
121 CGGTGACGAGGCTCAAACCACATATTGCGACGATCCCTACTACGCGATACCTCTGTACCG
181 TGGCTATTCAGGGTCGGGCACTGACCATTTCTATACCACCAATGGCGCGGAGATGGAGAA
241 TGCAGTCAGCAAGCTGGGTTATGCATACGAAGCGAACCTGGTATTGTCTTTGGCTCTTA
301 CTCCTCATACACCGACACAATTCCGCTTTACCGCGTGACAGCGGCAGTGCGGTGACCA
361 TTTCTATACCACATCGGCCAGCGAACGTGACAACGCCGTGGAACACCTCGGGTACAGCGA
421 TGAAGGCATTGCCGCTACGTTTATGGCAGCGATATCTGCGGCCATCCCCTCTACCG
    <<<<<<<<<
481 CACTACAGCCAAGCGCTACGGAT
    <<<<<<<<<<<<
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	19	19	58.84	57.89	0.00	0.00	0.00	CTCTGCAACTCCGTCAAGC
RIGHT PRIMER	454	20	58.13	50.00	0.00	0.00	0.00	ATCGCTGCCATAAACGTAGG
PRODUCT SIZE: 436, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	85	20	59.26	55.00	0.00	0.00	0.00	GGTCAATGCCATTGCGCTC
RIGHT PRIMER	494	19	60.08	57.89	0.00	0.00	0.00	GCTTGGCTGTAGTGCGGTA
PRODUCT SIZE: 410, PAIR ANY_TH COMPL: 9.60, PAIR 3'_TH COMPL: 2.58								
3 LEFT PRIMER	22	19	58.75	52.63	0.00	0.00	0.00	TGCAACTCCGTCAAGCATG
RIGHT PRIMER	429	20	60.18	55.00	0.00	0.00	0.00	ATGCCTTCATCGCTGTACCC
PRODUCT SIZE: 408, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
4 LEFT PRIMER	61	21	58.83	52.38	0.00	0.00	0.00	TGCTGTGTTCTCTCTCTCTC
RIGHT PRIMER	469	18	58.52	61.11	23.90	14.25	0.00	GATGGCGCCGAGATATC
PRODUCT SIZE: 409, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	624	0	0	0	0	19	0	251	111	0	0	13	0	0	230
Right	624	0	0	0	0	49	0	43	347	0	0	44	0	0	141

Pair Stats:

considered 930, unacceptable product size 922, primer in pair overlaps a primer in a better pair 1067, ok 8
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR 16D10

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

```

OLIGO      start  len  tm  gc%  any_th  3'_th  hairpin  seq
LEFT PRIMER      8   20 59.12 50.00  5.56  4.52  0.00 ACAACACTACTAGTCGCGCT
RIGHT PRIMER    408   19 59.02 57.89  0.00  0.00  0.00 CCCTGGAGAACTTGCCGTA
SEQUENCE SIZE: 413
INCLUDED REGION SIZE: 413

```

PRODUCT SIZE: 401, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

1 ATCAAAAACAACACTACTAGTCGCGCTACAAACACTTCTGCTTTACCTGAACTCTGAATA
  >>>>>>>>>>>>>>>>>>>>

61 TGTCGCTCACCCACTTCTTCTATGAGCCTTTCTATTCGCTCTCCGACTTTGACCGCTCT

121 TCGACGACGCGTTCAACGCTCGCACGGACAACGGAGCCAGAGGCGTGCGAAGGTGCC
C

181 AATCTAGCCTGACCTCAGGCACGTTCCGCCACGGGTTGACGTGCACGAGGACAAAGCTG

241 CGAACACTATTACCGCGAGCTTCGAGCTGCCCGCCTCAAGAAGGAGGACGTGCAGATCG

301 ACGTGCACAACGATCGGCTCACCGTTTCTGGAGAGAACAAGATCAGCTCGGAGCGCACCG

361 AGGATGGCTATGCCATCCGTGAGCGCGCTACGGCAAGTTCTCCAGGGACGCT
  <<<<<<<<<<<<<<<<<<<<

```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

```

      start  len  tm  gc%  any_th  3'_th  hairpin  seq
1 LEFT PRIMER     11  20 58.27 50.00  15.01  0.00  0.00 AACTACTAGTCGCGCTACA
  RIGHT PRIMER   413  19 59.33 57.89  0.00  0.00  0.00 AGCGTCCCTGGAGAACTTG
  PRODUCT SIZE: 403, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	71	0	0	0	0	4	0	23	0	0	0	0	7	0	37
Right	84	0	0	0	0	0	0	3	54	0	0	0	0	0	27

Pair Stats:

considered 74, unacceptable product size 72, primer in pair overlaps a primer in a better pair 250, ok 2
libprimer3 release 2.4.0

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ943.g1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seq
LEFT PRIMER	224	20	58.96	50.00	7.64	0.00	0.00	ACGGTAATGGCGCTAGATGA
RIGHT PRIMER	696	20	58.93	50.00	6.43	0.00	0.00	GAGCTCTGCGTTTCGACAAAT

SEQUENCE SIZE: 779
INCLUDED REGION SIZE: 779

PRODUCT SIZE: 473, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 CAGAGAAGAATATGAATCCTTGCATGTATTGATGAAAGCTACTGAACATGCATGAAATG

61 TGTACAGAGCGTTTCAATCAGAGCGGGATGCATATAATAAATACACAAAAGGATTGTGGG

121 ATGGTCTACCGGCAGATAGCTACTGTACTTGTGGACATAACTTAGAGAGTATGGACGAT

181 AAGAATACGCGAATGAAGTGGATGAGCCTAGAAATTGAAAGTAACGGTAATGGCGCTAGA
    >>>>>>>>>>>>>>>>>>

241 TGAGTAGTCCGATGGGTGGAATCAGGCGTGACCAATAAATTAATGAGCGATCGGGGTGAC
    >>>

301 AGTTAAGGGTGTTGCTGCCTGTTGGCGTTCTTGATAAGATCCGCGAGCGCGCTCTGCCATT

361 ATGTAGATAGCAGCCTGGGGTGGCGCTGCTGGGATTGCAGGCAGAATACTGCCATCAACA

421 ACACGCAGACCTCTCACTCCCTTCACCGTCAAATCCGGGTTAACCGCTCCCTTTCCATAC

481 GCGGGAGGGCCATATGGACCCATGGCTGCCGTGCCGAGAGGATGGTTAAAGCTGGCGGTG

541 TTTTGGCTGCATATGCGTCGAGCTCGGCATCGGTCTCAGCTGTGGCAAGATCTCCGTAT

601 GGCCCTAGGACATAGTTTGCCCATGCGGGTCTGCCACCATTCGCTTTGTCGCCTTGATG

661 GATTCACGGATAGTGAATTTGTCGAACGCAGAGCTCAAGATCCCGGGATTGGCGATGGGA
    <<<<<<<<<<<<<<<<<<<<<<

721 AGGTCCCAAGGTGATGCGGAAGCAAGCTTCAAAGTCTGCGGGAGGACGGAGAAGTGAC
```

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seq
1 LEFT PRIMER	290	20	59.09	55.00	0.00	0.00	0.00	ATCGGGGTGACAGTTAAGGG
RIGHT PRIMER	702	20	59.08	55.00	16.19	0.00	0.00	GATCTTGAGCTCTGCGTTTCG
PRODUCT SIZE: 413, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	66	20	58.65	50.00	0.00	0.00	0.00	AGAGCGTTTCAATCAGAGCG
RIGHT PRIMER	537	20	58.98	55.00	0.00	0.00	0.00	CGCCAGCTTTAACCATCCTC
PRODUCT SIZE: 472, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	187	20	58.35	50.00	15.93	0.00	0.00	ACGCGAATGAAGTGGATGAG
RIGHT PRIMER	606	20	58.95	55.00	6.18	0.00	0.00	AGGGCCATACGGAGATCTTG
PRODUCT SIZE: 420, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

4 LEFT PRIMER 70 20 58.34 50.00 0.00 0.00 0.00 CGTTTCAATCAGAGCGGGAT
 RIGHT PRIMER 532 20 58.70 55.00 0.00 0.00 0.00 GCTTTAACCATCCTCTCGGC
 PRODUCT SIZE: 463, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2280	0	0	0	0	177	0	1181	321	0	0	16	0	0	585
Right	2200	0	0	0	0	71	0	344	924	0	0	17	19	0	825

Pair Stats:

considered 2525, unacceptable product size 2518, primer in pair overlaps a primer in a better pair 489, ok 7
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

4 LEFT PRIMER 195 20 59.61 55.00 0.00 0.00 0.00 CATGCCCTTGACCATCATGC
 RIGHT PRIMER 666 20 58.35 55.00 14.51 0.00 0.00 GACAAGAGACTTGGCGATCC
 PRODUCT SIZE: 472, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2032	0	0	0	0	149	0	290	888	0	0	87	19	0	599
Right	2112	0	0	0	0	260	0	367	786	0	0	21	0	0	678

Pair Stats:

considered 3112, unacceptable product size 3107, primer in pair overlaps a primer in a better pair 490, ok 5
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      3  19  58.97  57.89  0.00  0.00  0.00  GAAAGGGCATGATGAGCGG
RIGHT PRIMER      456  20  58.80  55.00  21.89  10.86  0.00  TTGATGAGCTCCAGGAGACC
PRODUCT SIZE: 454, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER     311  20  57.74  50.00  0.00  0.00  0.00  CTGAACCAGCTCAAGGACAA
RIGHT PRIMER     759  20  58.81  50.00  4.91  0.00  0.00  ACGTCTAGCTGCTCCAATCA
PRODUCT SIZE: 449, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	X	stab
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			
Left	2349	0	0	0	0	876	0	180	824	0	0	24	6	0	439
Right	2364	0	0	0	0	973	0	191	899	0	0	0	0	0	301

Pair Stats:

considered 180, unacceptable product size 173, primer in pair overlaps a primer in a better pair 107, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ1823.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seg</u>
LEFT PRIMER	33	20	59.08	55.00	30.47	26.34	0.00	CTAACCTGAACGCTGCGATC
RIGHT PRIMER	457	20	58.93	55.00	0.00	0.00	0.00	GTTGACGCTCTTCTGCTCAG

SEQUENCE SIZE: 798
INCLUDED REGION SIZE: 798

PRODUCT SIZE: 425, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.91

```
1 CAAAAACCTGCAAACGCCCTACTACCTCTGCTAACCTGAACGCTGCGATCACCAACGC
  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
61 GTTCTACATTGTCAATTCGGTTCACGACTTTTCTTACCGCTACGGCTTACGGAGAGCGC
121 CTTCAACTTCCAGACCAACAACCTTCGGCAAGGGTGGTGGCTGGCAGCGACCGGTCACCGT
181 CAGCGTCCAGGACAGCGCCGGCACTGACAATGCTGATTTCTGACCCCTGCTGATGGTCA
241 ATCTGGTGCCATGCGCATGTTCTCTGGGACGAGACCAACCCGAGCGTATGGAGCACT
301 CGAGAACGACATTGTCGTCCACGAAAACACCCACGGTATCACCAACCGCATGACCGGTGG
361 TGGAACTGGCCGTTGCTTGCAAACCACCGAGGCCGGCGGTATGGGCGAAGGCTGGTCTGA
421 CGCCATGGCTGACTGGACTGAGCAGAAGAGCGTCAACTCAGGACTACGTCATGGGTCA
  <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
481 ATACGTCGTCACGACCCCGCCGGTATTGCTCGCACCCGTACTCCACCTGAAGACCAC
541 GAACCCCTCACCTACGGGTCGCTCAAGACTCTCACCGAAGTCACGATATCGGTGAAGC
601 TTGGGCCAACACCCTCCACAATGTCTACGCTGCTCTCGTCTCCGCGCACGGCTACTCTAG
661 CACTGCCGCACTACCCTGACGGCACTGAGGGCAACGTTGTCTTCTGCACCTATTCAT
721 TGACGCTTGCTATCCAGCCTGCAACCCCACTTTCTTGACTGGTCGCGATGCCATCATC
781 CAGCTGATGCTACCGCTA
```

KEYS (in order of precedence):

```
>>>>> left primer
<<<<<< right primer
```

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seg</u>
1 LEFT PRIMER	131	20	58.98	50.00	0.00	0.00	0.00	CAGACCAACAACCTTCGGCAA
RIGHT PRIMER	589	20	59.19	55.00	0.00	0.00	0.00	ATCGTGGACTTCCGGTGAGAG
PRODUCT SIZE: 459, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	216	20	58.79	50.00	0.00	0.00	0.00	ATTCTCGACCCCTGCTGAT
RIGHT PRIMER	633	20	59.00	55.00	0.00	0.00	0.00	GCAGCGTAGACATTGTGGAG

PRODUCT SIZE: 418, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 5.38

3 LEFT PRIMER 336 20 58.99 55.00 0.00 0.00 0.00 GTATCACCAACCGCATGACC
RIGHT PRIMER 759 20 59.32 55.00 0.00 0.00 0.00 CAAGAAAGTGGGGTTGCAGG
PRODUCT SIZE: 424, PAIR ANY_TH COMPL: 13.40, PAIR 3'_TH COMPL: 1.18

4 LEFT PRIMER 210 20 58.79 50.00 0.00 0.00 0.00 ATGCTGATTTCTCGACCCCT
RIGHT PRIMER 706 20 59.13 55.00 27.61 2.92 0.00 GAAGACAACGTTGCCCTCAG
PRODUCT SIZE: 497, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	ok
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2394	0	0	0	0	275	0	355	1006	0	0	40	0	0	718
Right	2319	0	0	0	0	202	0	318	990	0	0	5	19	0	785

Pair Stats:

considered 121, unacceptable product size 112, primer in pair overlaps a primer in a better pair 33, ok 9
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ2064.b1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	145	20	58.92	55.00	0.00	0.00	0.00	CAAGTGCATCAACCTCTCCG
RIGHT PRIMER	594	19	58.85	57.89	13.01	0.00	0.00	CAGTCGACCTTGTGCTTCG

SEQUENCE SIZE: 789
 INCLUDED REGION SIZE: 789

PRODUCT SIZE: 450, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

1 GAACAACGACGTGACGCTCTTCTTCGGGCTGTCGGGGACGGGCAAGACCACGCTCTCCGC

61 GGACCCGCGCCGGCTGCTCATCGGCACGACGAGACGCTCTGGTCCGACACGGGCGTGTT

121 CAACATCGAGGGCGGGTGCTACGCCAAGTGCATCAACCTCTCCGCCGAGAAGGAGCCGGA
  >>>>>>>>>>>>>>>>>>

181 GATCTTCAACGCGATCCGCTTCGGGAGCATCTCGAGAACGTGCTCTACAACCCCGTCTC

241 GCGCGTGCCCGACTATGACGACGTCCGATCACGGAGAACACGCGCTGCGCGTACCCGAT

301 CGAGTTCATCCCCAACGCGCAGATCCCGTGCGCCGTCGACGCCAGCCGAGCAACATCAT

361 CATGCTCACCTGCGACGCCTTTGGCGTCTCCCGCCGTCAGCAAGCTCACCCCGAGCA

421 GGCCAGCTACCACTTCTCGCGGGCTACACCTCGAAAACCCCGGCACGGAAGACGGTGT

481 GCTGGAGCCCATCCCCACCTTCTCCACGTGCTACAGCGGCCCTTTATCGTCTCCACCC

541 CGGCCGCTACGCCTCGATGCTCGCGGAGCGCATGGCGAAGCACAAGGTCGACTGCTGGCT
  <<<<<<<<<<<<<<<<<<<<<

601 CATCAACACCGGCTGGACGGGCGCAAATTCGGCACGGGCAAGCGCTGCCCGCTCAAATA

661 CACGCGGCGCATCGTCGACGGTGCCTCGGGCGAGCTCGCCGCGGCCGAGTACGAGAC

721 CTTCGGGACGTTAACCTCGCGATCCCGACCGCGCTCGAGGCGTGC CGCGACCTGCTG

781 AACCCGAGC
  
```

KEYS (in order of precedence):

>>>>> left primer
 <<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	344	20	58.69	50.00	0.00	0.00	0.00	CAGCCGAGCAACATCATCAT
RIGHT PRIMER	745	19	59.01	57.89	16.66	7.89	0.00	GATCGCGAGGTTGAACGTC
PRODUCT SIZE: 402, PAIR ANY_TH COMPL: 3.27, PAIR 3'_TH COMPL: 4.26								
2 LEFT PRIMER	169	20	58.88	55.00	5.05	0.00	0.00	GAAGGAGCCGGAGATCTTCA
RIGHT PRIMER	664	19	59.28	57.89	0.00	0.00	0.00	CGTGTATTGAGCGGGCAG

PRODUCT SIZE: 496, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

3 LEFT PRIMER 115 19 59.21 57.89 0.69 0.00 0.00 CGTGTTCAACATCGAGGGC
RIGHT PRIMER 516 20 59.40 55.00 18.88 0.00 0.00 CTGTAGCACGTGGAGAAGGT
PRODUCT SIZE: 402, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 112 19 59.21 57.89 14.25 0.15 0.00 GGGCGTGTTCAACATCGAG
RIGHT PRIMER 540 20 59.53 60.00 0.00 0.00 0.00 GGGTGGAGGACGATAAAGGG
PRODUCT SIZE: 429, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2340	0	0	0	0	625	0	90	1162	0	0	11	0	0	452
Right	2226	0	0	0	0	844	0	33	1013	0	0	11	31	0	294

Pair Stats:

considered 361, unacceptable product size 352, primer in pair overlaps a primer in a better pair 83, ok 9
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ2089.g1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	31	21	57.89	47.62	3.53	3.53	0.00	TCGACCGATGTATTATACGCG
RIGHT PRIMER	444	20	59.21	55.00	0.00	0.00	0.00	GTGTGTCTGGCGTTTCATCAG

SEQUENCE SIZE: 740
INCLUDED REGION SIZE: 740

PRODUCT SIZE: 414, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 CCAAAAAAAAAAATCGCTGCGGTCTCGTTCGACCGATGTATTATACGCGACGCCGTCT
   >>>>>>>>>>>>>>>>>>>>
61 ACAACCAAACCTAAACCCAAACCAACCCACAACAACCAACTATCACTGCTACCGCTTCCC
121 CCCGCCGCCTTCCCCTTCGCCGCGACGAAGAGCCACCCGACCGAGGACGACGCGCAC
181 GCCCGCGCCGATGCCGAGCGGGGAGCCCGCGGACTGGAGGATCGCGGGCCGAC
241 GAAGCCGCGGAGGAAGAGCGGAGGATGGGAGCAGCTTGTTGCGCGGTGATGATGCG
301 GCGGGGAGCTGGAGGAGCTGCGGGTGGCCATGAGCTGCACCAGACGGTGGTGAGGAC
361 GATGGTGGTTGCAAACCTGGGTGTTGACGCGCTTGCCCATGATGCCCTGCAGGCCAAACT
421 AGCGCTGATGAACGCCAGACACAAACGTCGCGACTCCGTCCACGGGGTTCGTCGCG
   <<<<<<<<<<<<<<<<<<<<<<
481 CGCGTTGCGGAGCTGCCCTGGCCGCTTTCACAGCGGAGGGCGGGCCATGGTGAG
541 CAGCGCTGGACGAAGGTGCCGAGTGGAGCCAGGCGGGTGGTGCGGGCAGGCGGTTC
601 GCCGATGCGGCGAGGGAGGCGCGGAGGATGAAGGCGAGGACGGAGGTGAGGGCTTGTG
661 GTCGGGGAGGCGGAAGGAGGTGTCGTGGCCTGTGGCGTGTTTGAAGAGGCGGGCGAG
721 GCGGAGGGCGAGCTGGACGG
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	51	20	59.49	55.00	10.56	0.00	0.00	GACGCCGTCTACAACCAAC
RIGHT PRIMER	456	19	60.01	57.89	0.00	0.00	0.00	GTGCGGACGTTTGTGTGTC
PRODUCT SIZE: 406, PAIR ANY_TH COMPL: 4.60, PAIR 3'_TH COMPL: 0.72								
2 LEFT PRIMER	250	18	58.88	61.11	12.10	0.00	0.00	GAGGAAGAGCGCGAGGAT
RIGHT PRIMER	711	20	59.69	55.00	0.00	0.00	0.00	CTCTCCAAAACACGCCAC
PRODUCT SIZE: 462, PAIR ANY_TH COMPL: 12.98, PAIR 3'_TH COMPL: 16.50								
3 LEFT PRIMER	77	20	59.09	50.00	0.00	0.00	0.00	CAAACCAACCCACAACAA
RIGHT PRIMER	564	18	60.13	66.67	0.00	0.00	0.00	CTCGGCACCTTCGTCCAG
PRODUCT SIZE: 488, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

4 LEFT PRIMER 50 18 59.74 61.11 16.07 0.00 0.00 CGACGCCGTCTACAACCA
 RIGHT PRIMER 449 19 59.28 52.63 0.00 0.00 0.00 CGTTTGTGTGTCTGGCGTT
 PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 5.36, PAIR 3'_TH COMPL: 4.49

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	
Left	1994	0	0	0	0	993	0	202	514	0	0	72	17	0	196
Right	2046	0	0	0	0	1019	0	23	793	0	0	7	0	0	204

Pair Stats:

considered 3812, unacceptable product size 3806, primer in pair overlaps a primer in a better pair 572, ok 6
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ2905.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	116	20	59.04	55.00	0.00	0.00	0.00	GCGTCCGTATTCCCTATCCA
RIGHT PRIMER	594	20	59.10	50.00	0.00	0.00	0.00	AGCAATGTCCTGGTGATCGA

SEQUENCE SIZE: 826

INCLUDED REGION SIZE: 826

PRODUCT SIZE: 479, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 GTGCGGAACCGAGTTCCACCCTTCGTGCTCGTGC GCGATGCTTCCGCTCAGTCAAGGCCG

61 TGTCGTTGACACCGATCTGCGGTATATGGTCTCGGAATGTCCGTGTCGTCGACGCGTC
>>>>

121 CGTATTCCCTATCCAGTTGCGCGCTCATCTCCAAGCACCTGTATATGGCCTCGCCGAGCA
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

181 AGCTTCAGACATAATTCGGTCGTTCTACAATGCCGCGCCTCCCTCCGCATCTCCAACATC

241 CTCCTCATCCGCCCATCTTCTCCAATTCGTCAAGACCCAACAGACTACGTCCGCGCGC

301 GCATTCCAGGTCCGCGCGGTTGGCGCTGAGTCCCTCAGCTCTGTATTCTGTTGACTGTT

361 GACCTTGCTGCTGCTGTTGTAGACGTCTCCCCCACTCTTTTCTCATTTGCTCTTTTG

421 TGTCTTCCCTGCTTACTACTACAGTCTACCGCTCAGCAGCTCGCCTGCCTATCTCA

481 CCTCGGACTTACCTCCTGCTGTTGTGCTGTTGTCATCGCATTGCTAACCCTGTATATG

541 CGATCACTCGCCTGCTCCTCTCTCGCCCTCATAATCGATCACCAGGACATTGCTTGTGTTGT
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

601 CAGCCGCGCTCCCATCCATCCATCTACATTCCATCCTCAGATGCATAAGACATTTCTA

661 CACATCGGACTTACGAAACACGAAACACGCCCAGACTTTACCGTATTATACCTTGCTCT

721 ATAGTTTTTGGTCTACATACCCCACTCCTCCCTGCAACCCCTTTCTCCCATGTCT

781 CGCGCATTTCATGCTTCGTATCCTGGAGGTCGAGTTGCTACGCTG
```

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	263	20	58.94	50.00	0.00	0.00	0.00	TCCAATTCGTCAAGACCCA
RIGHT PRIMER	702	20	58.85	55.00	0.00	0.00	0.00	GGTAAAGTCTGGGCGTGTT
PRODUCT SIZE: 440, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	73	20	58.74	55.00	8.43	0.00	0.00	CGATCTGCGGTATATGGTC
RIGHT PRIMER	509	20	58.83	55.00	0.00	0.00	0.00	GACAACGAGCAGAGGAGGTA

PRODUCT SIZE: 437, PAIR ANY_TH COMPL: 20.55, PAIR 3'_TH COMPL: 16.71

3 LEFT PRIMER 368 20 58.94 55.00 7.70 7.70 0.00 CTGCTGCTGTTGTAGACGTC
RIGHT PRIMER 781 20 59.45 60.00 0.00 0.00 0.00 GAGACATGGGAGGAAAGGGG
PRODUCT SIZE: 414, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 154 20 59.32 55.00 3.32 0.00 0.00 AGCACCTGTATATGGCCTCG
RIGHT PRIMER 627 20 59.22 55.00 0.00 0.00 0.00 AGATGGGATGGAATGGGAGC
PRODUCT SIZE: 474, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2482	0	0	0	0	222	0	544	939	0	0	12	19	0	746
Right	2371	0	0	0	0	65	0	913	519	0	0	14	49	0	811

Pair Stats:

considered 515, unacceptable product size 509, primer in pair overlaps a primer in a better pair 48, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 455, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 67 20 58.55 50.00 20.86 0.00 0.00 CGCAGGCTGAAATCTTGACT
RIGHT PRIMER 553 20 59.29 55.00 0.62 7.17 0.00 GCGTTGTCCACAGTGATACG
PRODUCT SIZE: 487, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high			
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2171	0	0	0	0	115	0	338	1041	0	2	25	19	0	631
Right	2164	0	0	0	0	48	0	745	634	0	0	9	19	0	709

Pair Stats:

considered 868, unacceptable product size 861, primer in pair overlaps a primer in a better pair 132, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ3444.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	196	20	59.06	50.00	0.00	0.00	0.00	TGCGTTGACTGAGAAAGC
RIGHT PRIMER	684	20	58.90	50.00	0.00	0.00	0.00	TGATGCGATGTAGGACGTGA

SEQUENCE SIZE: 821
INCLUDED REGION SIZE: 821

PRODUCT SIZE: 489, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1  ATTGATGCCGATGGTATCGTACATGTCACCGCAAGGACAAGGCTACCAACAAGGATCAG
61  TCGATGACTATCGCTTCTTCGTCTGGCCTCAGTGACAAGGACATCGAGCGCATGGTCTCT
121 GACGCTGAACAGTTTGTCTGAGGCCGACAAGGCTCGTCGGGACCTCATTGAAGAGTCGAAC
181 AAGGCTGAGTCTGTGTGCGTTGACTGAGAAAGCGATGACCGAGTTCAAAGACCAATTG
    >>>>>>>>>>>>>>>>>>>
241 GATGCTACCGAGAAGGAGAAGGTACCAAGCACCTCGTTGAGCTTCGTGAGCTCGCCGTC
301 AAAGGTCAGGCTGGTGACGAATCTGTTACTGCCGATGCCATCCGCGAGAAGATCAACGAG
361 GCTCAGCAGGCTTCGCTTGGTCTTTTCCAGAAGGTCTACGAGAAGCGTAACCGGAAAAC
421 AACGCCTCGTCTTCATCAGAGACTGAAACCCGAGAAGAAGGATTAATGCCTTTT
481 TCCATGTTTTAGCCTTCTCTCTTTTGGAACTCTTTGCATCTCATCGACTTACCTTATGA
541 TCGCTCTGCACCTTACGTCTTCGATTCGTCTCATCGCTTTTTATCTGCATGTCCACCCTA
601 CACTCACTCATAGAGCACTTGCTTAAAAGTACCCTTCGCATCGTTATGACCTCTCGTACA
661 TTA CT CACGTCTACATCGCATACCCCCACTGGCGCATATATTCGGTCTGGTTTTATC
    <<<<<<<<<<<<<<<<<<<<
721 TCGTATCCCCACTACAGCCCCCACCCCCGCTCAGTAGTTATTCCGTTTTTTTTTCGT
781 CCTTGCCATGATCACTCCTGTATGTCCCTCAGGGTCTCCTT
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	339	20	59.15	55.00	8.23	0.00	0.00	CATCCGCGAGAAGATCAACG
RIGHT PRIMER	796	20	59.10	50.00	0.00	0.00	0.00	AGTGATCATGGCAAGGACGA
PRODUCT SIZE: 458, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	15	20	58.98	50.00	8.23	6.73	0.00	TATCGTACATGTCACCGCGA
RIGHT PRIMER	442	20	59.26	55.00	0.00	0.00	0.00	TCTCTGATGAAGACGAGGCG

PRODUCT SIZE: 428, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

3 LEFT PRIMER 308 20 59.31 50.00 0.00 0.00 0.00 AGGCTGGTGACGAATCTGTT
RIGHT PRIMER 707 20 58.92 55.00 7.66 4.20 0.00 CCGAATATATGCGCCAGTGG
PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 5.18, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 175 20 58.96 50.00 0.00 0.00 0.00 TCGAACAAGGCTGAGTCTGT
RIGHT PRIMER 604 20 59.38 55.00 0.00 0.00 0.00 AGTGTAGGGTGGACATGCAG
PRODUCT SIZE: 430, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2532	0	0	0	0	17	0	574	805	0	0	43	0	0	1093
Right	2188	0	0	0	0	141	0	1086	128	0	0	13	93	0	727

Pair Stats:

considered 452, unacceptable product size 447, primer in pair overlaps a primer in a better pair 73, ok 5
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ3601.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	205	20	58.92	55.00	0.00	0.00	0.00	GTGTCATCCTCGCTTCCAAC
RIGHT PRIMER	620	20	59.03	55.00	0.00	0.00	0.00	AGTGGTACGGTGGTAGGAG

SEQUENCE SIZE: 786
INCLUDED REGION SIZE: 786

PRODUCT SIZE: 416, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 CAACGATGAGCGGGTTCCGGTTTTTGAATCTCGTTGACCTTCCTCCCATACTCCCCG
61 AGGTTTCTCCCCGGACCGCAAGTCCCTTCAATCAGAAAGTACTATGGACGGCCGTCA
121 CACTCCTCATCTTCTTGGTCTGCTCACAGTCCCGCTGTACGGGATCATGTCTCCGACT
181 CGTCTGACCCCTCTACTGGATGCGTGTTCATCCTCGCTTCCAACCGTGAACCTTTATGG
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
241 AATTGGGTATCAGTCCAATCGTGACCTCCGGGATGATCATGCAGCTCCTCGCGGGTGCCA
301 ATCTTATTGAGTTGATTTCTCCTTGAAGGAAGATCGTGCTCTGTTTCAGCGGTGCCAGA
361 AGCTCTTGTCTCATCATCGCCCTTGCCCAAGCAACAGTCTACGCTCCTGACCGGTCTCT
421 ATGGACAGCCCGCGACTTAGGCGCCGGCGTCTGTCTCCTGCTCATCATCCAGCTTGTG
481 CTGCCGGTCTCATCGTCTCTTCTTGTGAGCTCTTGCAGAAGGGCTACGGTCTCGGCT
541 CCGGCATCTCTCTTCATCGCGACCAATATTTGTGAGTCGATTGTATGGAAGGCATTCT
601 CTCCTACCACCGTCAACTGGCCGCGGGCCCGAGTTTGAGGGCGCGATCGTGTCTGCTGT
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
661 TCCACCTTCTTTTACCTGGAACGACAAAGCCGCGCTCCGCGAGGCCTTCTGGCGCG
721 AGCGCCTGCCAAATGTCATGAACCTCGTTGCAACTGTCGCCGTGTTGCCGTCGTCATCT
781 ATCTGC
```

KEYS (in order of precedence):
>>>>> left primer
<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	28	20	58.90	55.00	0.00	0.00	0.00	ATCTCGTTCGACCCTTCCTC
RIGHT PRIMER	468	20	59.19	55.00	0.00	0.00	0.00	TGATGAGCAGGAGACAGACG
PRODUCT SIZE: 441, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	191	20	59.18	55.00	0.00	0.00	0.00	CCTCTACTGGATGCGTGTCA
RIGHT PRIMER	613	20	59.18	55.00	0.00	0.00	0.00	ACGGTGGTAGGAGAGAATGC

PRODUCT SIZE: 423, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

3 LEFT PRIMER 37 20 58.57 60.00 0.00 0.00 0.00 GACCCTTCCTCCCCATACTC
RIGHT PRIMER 503 20 59.25 55.00 0.00 0.00 0.00 AAGGATGACGATGAGACCGG
PRODUCT SIZE: 467, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 272 20 58.57 55.00 14.30 0.00 0.00 GATGATCATGCAGCTCCTCG
RIGHT PRIMER 758 20 58.70 50.00 23.21 0.00 0.00 GACAGTTGCAACGAGGTTCA
PRODUCT SIZE: 487, PAIR ANY_TH COMPL: 5.95, PAIR 3'_TH COMPL: 5.95

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2163	0	0	0	0	94	0	570	746	0	1	16	38	0	698
Right	2322	0	0	0	0	437	0	452	734	0	0	7	0	0	692

Pair Stats:

considered 236, unacceptable product size 230, primer in pair overlaps a primer in a better pair 81, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Pair Stats:

considered 4588, unacceptable product size 4584, primer in pair overlaps a primer in a better pair 1317, ok 4
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

RIGHT PRIMER 427 20 58.90 55.00 0.00 0.00 0.00 CGTAGACCCCGATGAACTCA
PRODUCT SIZE: 418, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1782	0	0	0	0	145	0	605	405	0	0	14	19	0	594
Right	1798	0	0	0	0	21	0	552	513	0	0	3	18	0	691

Pair Stats:

considered 109, unacceptable product size 103, primer in pair overlaps a primer in a better pair 135, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      121  20  58.74  55.00  0.00  0.00  0.00 CCTTTACTCCACGTCCTCA
  RIGHT PRIMER     558  20  59.06  55.00  12.47  11.84  0.00 AGAACGCGGATAGACTCGAG
  PRODUCT SIZE: 438, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 8.01

4 LEFT PRIMER      372  20  59.54  55.00  0.00  0.00  0.00 GCGTACCGACATTGACCCTA
  RIGHT PRIMER     778  20  58.91  55.00  0.00  0.00  0.00 CCTCCGTAGTGTGTCATCGA
  PRODUCT SIZE: 407, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	X	stab
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			
Left	2208	0	0	0	0	151	0	458	861	0	0	11	32	0	695
Right	2163	0	0	0	0	175	0	308	913	0	0	5	39	0	723

Pair Stats:

considered 117, unacceptable product size 109, primer in pair overlaps a primer in a better pair 113, ok 8
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ3977.b1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	57	20	59.18	50.00	0.00	0.00	0.00	AGTACACACACACACCGTCA
RIGHT PRIMER	534	20	59.32	55.00	0.00	0.00	0.00	TCTGCCCTATATCGCACACC

SEQUENCE SIZE: 782
 INCLUDED REGION SIZE: 782

PRODUCT SIZE: 478, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

1 GTAATGTGCCACACACGCGCATGTATCAACACGCATACGCGCACCAAACAGTCTACAGTA
    >>>>

61 CACACACACACCGTATGAACGCGCGACCGACGTAGCCCGAGGCCTCTATCGTATATATC
    >>>>>>>>>>>>>>>

121 GTATACCGGTAAACCGTAAACCGTAAAAAAAACATATGTGTTTCTATTCGTACGCGC

181 GTGTCCGCTTTCGCCAGCCAGCCAGCCAGCCAGCCGCGTAGGAGTAACAGCAGCAAGCAGG

241 CGGTGCAGGAGCGCGAGACCAGGAGGGCTGGACCCAGAGGGCACGACGGGTGCGCTGCGC

301 ACGCGTCGTGCTCGCCCAAGCCGCCAACATCCGATCTGCGCGCGTCCGAGCCCATG

361 GCATCGCATCGTAATAGAAGGTGGGGAGACAGAAAAAATCAACATCCAGTGTCTATA

421 CAGTCGTGAGCGTGGTGCAGGGGTGTGTCGGCGTAAAAGCGTGCCTAATAGCGTGGTGGG

481 AGCATAGGATCCGTCCTCGCCGCGCGTCTGAGGGTGTGCGATATAGGGCAGACGGCGT
    <<<<<<<<<<<<<<<<<<<<<<<<

541 CGAGAGATCGCGGAGCAGGACGGGACGGGGCAGAGTACGCGCAGACGCTCAAGCCGCAGA

601 GGGCAGCGTTCGCGTTTCCGAGAGTATAACCCAAAAAAGAATGCGGGATGGATAGGC

661 GAATAGATTCCGTCCAGATGAGAGCGAGCATGATGACCGCGCGGGCCGAGAGAGAGAGA

721 GAGAAATGAGGATCGAAAAGAGAGTGCAGGGCGAGTGTGCGTGAGTGAAAGATCGATGCAA

781 GT
  
```

KEYS (in order of precedence):

```

>>>>> left primer
<<<<<< right primer
  
```

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	375	20	58.91	55.00	0.00	0.00	0.00	TAGAAGGGTGGGGAGACAGA
RIGHT PRIMER	774	20	58.58	50.00	0.00	0.00	0.00	CGATCTTCACTCACGCACA
PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 10.08, PAIR 3'_TH COMPL: 5.81								
2 LEFT PRIMER	356	20	58.84	50.00	0.00	0.00	0.00	CCATGGCATCGCATCGTAAT
RIGHT PRIMER	770	20	59.50	55.00	0.00	0.00	0.00	CTTCACTCACGCACACTCG
PRODUCT SIZE: 415, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

```

3 LEFT PRIMER      61  20  58.71  50.00  0.00  0.00  0.00  CACACACACACCGTCATGAA
  RIGHT PRIMER    495  20  59.68  60.00  10.75  0.00  0.00  GACGGATCCTATGCTCCCAC
  PRODUCT SIZE: 435, PAIR ANY_TH COMPL: 10.63, PAIR 3'_TH COMPL: 4.40

4 LEFT PRIMER      39  20  59.49  55.00  0.30  0.00  0.00  GCGCACCAAACAGTCTACAG
  RIGHT PRIMER    530  20  59.76  60.00  0.00  0.00  0.00  CCCTATATCGCACACCCTCG
  PRODUCT SIZE: 492, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	stab	ok
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2250	0	0	0	0	833	0	356	630	0	0	20	16	0	395
Right	2192	0	0	0	0	559	0	385	739	0	0	8	36	0	465

Pair Stats:

considered 300, unacceptable product size 294, primer in pair overlaps a primer in a better pair 171, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 429, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 80 19 58.97 57.89 0.00 0.00 0.00 GAGTACTGCCGACGCCTAT
RIGHT PRIMER 528 20 59.06 50.00 0.00 0.00 0.00 ATGTCGTGTTGCTGTTGTCC
PRODUCT SIZE: 449, PAIR ANY_TH COMPL: 5.14, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high			
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2064	0	0	0	0	64	0	368	858	0	0	14	0	0	760
Right	2064	0	0	0	0	121	0	419	799	0	0	21	0	0	704

Pair Stats:

considered 659, unacceptable product size 654, primer in pair overlaps a primer in a better pair 206, ok 5
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

4 LEFT PRIMER 45 21 59.13 47.62 26.09 0.00 0.00 CAACAAGACGTCATGACTGCA
 RIGHT PRIMER 477 20 59.12 50.00 7.64 0.00 0.00 CACATTTCAAGAAGGGCGCT
 PRODUCT SIZE: 433, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	ok	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	
Left	1662	0	0	0	0	163	0	703	349	0	0	7	0	0	440
Right	1662	0	0	0	0	177	0	358	696	0	0	5	0	0	426

Pair Stats:

considered 225, unacceptable product size 218, primer in pair overlaps a primer in a better pair 41, ok 7
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ5028.b1

Template masking not selected

No mispriming library specified

Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seg</u>
LEFT PRIMER	240	20	58.90	55.00	8.11	0.00	0.00	GAGCCTCGTATCACTGTGGA
RIGHT PRIMER	687	20	58.98	50.00	0.00	0.00	0.00	TTCGTTTGTGGCAAGACTGG

SEQUENCE SIZE: 738

INCLUDED REGION SIZE: 738

PRODUCT SIZE: 448, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 AGATCACTGGCCCTACAGATCGCAAGATGGTCATCAATGCTCTCAACAGCGGGGCTAAGA
61 CATTTCATGGCTGACTTTGAAGACGCCAGCTCACCAACATTCAAGGCAATGATCGAGGGTC
121 AGGTCAATCTCAGGGATGCCATTCTGTCGCCAGATTGATTTTCGAGTCTAACGGGAAACAAT
181 ACAAACCTTCTCCGAATCCCCTGCTCTCATTGTAAGGCCAAGAGGATGGCACCTTGACG
>
241 AGCCTCGTATCACTGTGGACAACGCGCGGTCTCTGGCTCTCTTTTCGATTTTGCCTCT
>>>>>>>>>>>>>>>>>>
301 ACTTTTACCACAACGCGAAGGAGCTTGCAAGCGCGCTTCGGGCCCTATTTTACCTCC
361 CCAAGATGGAACACTACCTCGAAGCGGCCTTTGGAATGATGTTTTCTGCTTCTCACAGT
421 CCTACATCGGCATGCCCCACAACACCATCCGTGGGACTGTCTTAATTGAGACTCTGCCTG
481 CCGCCTTCCAGATGGAGGAGATCTCTTCGAGTTGCGCAATCACTCATCAGGCCTCAACT
541 GCGGAAGATGGGACTACATCTTCAGCTTCATCAAGAAGCGGAGAGCCGACAGGAGCGCCG
601 TGCTCCCCGACAGAAAGGACGTACCCATGGAGGTGGGATTCATGGATTCCTACGTCCGGT
661 TGCTCATCCAGTCTTGCCACAACGAAAAGTTGCCGCCATGGGTGGAATGTCCGCTCAGA
<<<<<<<<<<<<<<<<<<<<<<
721 TCCCGATCAAGGCGATGA
```

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seg</u>
1 LEFT PRIMER	88	20	59.04	50.00	0.00	0.00	0.00	GCTCACCAACATTCAAGGCA
RIGHT PRIMER	532	20	58.91	50.00	27.24	27.24	0.00	CCTGATGAGTGATTGCGCAA
PRODUCT SIZE: 445, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	84	20	59.04	50.00	0.00	0.00	0.00	GCCAGCTCACCAACATTCAA
RIGHT PRIMER	557	20	59.18	55.00	0.00	0.00	0.00	GTAGTCCCATCTCCGCAGT
PRODUCT SIZE: 474, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	197	20	58.73	50.00	0.00	0.00	0.00	TCCCGCTGTCTCATTGTAA

RIGHT PRIMER 676 20 58.92 55.00 0.00 0.00 0.00 CAAGACTGGATGAGCAACCG
PRODUCT SIZE: 480, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 1.78

4 LEFT PRIMER 49 20 59.05 55.00 0.00 0.00 0.00 GCGGGGCTAAGACATTCATG
RIGHT PRIMER 536 20 58.69 55.00 12.00 0.00 0.00 GAGGCCTGATGAGTGATTGC
PRODUCT SIZE: 488, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high		high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2009	0	0	0	0	48	0	675	542	0	0	18	8	0	718
Right	2034	0	0	0	0	110	0	519	642	0	0	11	0	0	752

Pair Stats:

considered 299, unacceptable product size 292, primer in pair overlaps a primer in a better pair 83, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCOZ5175.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

```
OLIGO           start  len   tm   gc%  any_th  3' th hairpin seq
LEFT PRIMER      273   20   59.02 50.00  0.00   0.00   0.00 TGCTGTCCAAGTGCTATCCA
RIGHT PRIMER     730   20   58.95 50.00  0.00   0.00   0.00 TCGTACACTGGCTTTGTCCT
SEQUENCE SIZE: 797
INCLUDED REGION SIZE: 797
```

PRODUCT SIZE: 458, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 ACCAGATTGGCGTTGCATCACATCGGCAGGCTCCTCTTTACTCAGGCAACAGAGCTGATG

61 AACCTAGTATGAACCGCGGGCTTCCACCGTCGCTCGCTGCGACCGATCCGTCTCTCAAC

121 TACCACACCAAGGGCCTGGACATTGCTATGGCCGCATATGTCAGTGAGCTCGGACACCTT

181 GCTAGCCCTGTGTCAACCCATATCCAGTCCGCGGAGATGCATAACCAAGCTGTCAATTCT

241 TTGGCCCTCATCTCAGGTCGCATGACCGTCAGTGCTGTCCAAGTGCTATCCATGCTGACG
   >>>>>>>>>>>>>>>>>>>>

301 GCGACGTATTTGTATGCTCTTTGTCAAGCCCTTGACCTTCGCACCATGGATGCCGAATTC

361 CGCCTAGGCCTTGCTACTATAGTAGAAGAAGAATTACATGCCCGATTTCGATCGGCATCTG

421 TCAGCGCTCGAACCAACATCGCTGTTGCAGAAGACCATTTCCATCATGTACCAAACGCTG

481 GACGTGACAACCACCATGGACACCCGACCCCGCATGAAAAGGGTCGTTTCGTCATCTTCG

541 TCAGTCTTTTTAGATGTCTTCGCTACATCAGTCGATAGTACATCAGCACTGGCGGTCTTC

601 CCGGACTTCTGTGACAGAGTGGCCTCTCGTGCCACATCGTTCATAGTATCTCTCCGCGAG

661 GAATACCTAGGCGTAGTCGTGGACCCGCGCCGCAAGCAAGATGCTCAAGAGGACAAAGC
   <<<<<<<<<<<<<<

721 CAGTGACGAATTTGTCCGTGTCACGCTGGCATCGCGATGCACGGAAGGAGACGACGAG
   <<<<<<<<<<<<<<

781 CTATTCGCCCATGGATT
```

KEYS (in order of precedence):

```
>>>>> left primer
<<<<<< right primer
```

ADDITIONAL OLIGOS

```
           start  len   tm   gc%  any_th  3' th hairpin seq
1 LEFT PRIMER      130   20   59.07 50.00  6.92   0.00   0.00 AAGGGCCTGGACATTGCTAT
  RIGHT PRIMER     540   20   59.01 55.00  0.00   0.00   0.00 CGAAGATGACGAAACGACCC
  PRODUCT SIZE: 411, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00
```

```

2 LEFT PRIMER      145  20  58.92  55.00  4.29  0.00  0.00  GCTATGGCCGCATATGTCAG
  RIGHT PRIMER     615  20  59.03  55.00  0.00  0.00  0.00  GTCACAGAAGTCCGGGAAGA
  PRODUCT SIZE: 471, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

3 LEFT PRIMER      269  20  58.95  50.00  0.00  0.00  0.00  TCAGTGCTGTCCAAGTGCTA
  RIGHT PRIMER     723  20  58.84  55.00  0.00  0.00  0.00  CTGGCTTTGTCCTCTTGAGC
  PRODUCT SIZE: 455, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER       29  20  59.09  55.00  0.00  0.00  0.00  GGCTCCTCTTTACTCAGGCA
  RIGHT PRIMER     459  20  59.12  50.00  0.00  0.00  0.00  AATGGTCTTCTGCAACAGCG
  PRODUCT SIZE: 431, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	ok	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	
Left	2388	0	0	0	0	140	0	562	777	0	0	8	0	0	901
Right	2309	0	0	0	0	114	0	595	759	0	0	8	19	0	814

Pair Stats:

considered 91, unacceptable product size 84, primer in pair overlaps a primer in a better pair 38, ok 7
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

4 LEFT PRIMER 69 20 59.17 55.00 0.00 0.00 0.00 GAGTGGGGCATCAGAAGCTA
 RIGHT PRIMER 561 18 59.03 55.56 8.37 0.00 0.00 AGAGCTCGAACGCATGGT
 PRODUCT SIZE: 493, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1938	0	0	0	0	83	0	1042	338	0	0	59	0	0	416
Right	1902	0	0	0	0	220	0	333	768	0	0	71	10	0	500

Pair Stats:

considered 4983, unacceptable product size 4977, primer in pair overlaps a primer in a better pair 1182, ok 6
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA575.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	178	20	59.02	55.00	0.00	0.00	0.00	CCCCAAGCACCTCTACAAGA
RIGHT PRIMER	663	20	59.41	60.00	6.85	4.93	0.00	CTGTAGATCGGCGTCTCCTC

SEQUENCE SIZE: 798
INCLUDED REGION SIZE: 798

PRODUCT SIZE: 486, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 3.98

```
1 AGCTCCTGCTCGCTCTACTTGCTGCTCCCTCCCTCCCTTCGCACTCCCCGCCCCACGCCC
61 CACGCTGCTCACCATGTCCGTCTCAGCCTCTTCTACGACGGCCCGAGTACAAGGAGCG
121 CCTTACCAAGGACTTTGTCCCCCAAAGGCGACCCTCGCAGAGATCCACGCCCGCTCCC
    >>>
181 CAAGCACCTCTACAAGAAGTCCACCCTCAAGGCCTTCTACTACACCGCCCGCAGCTCGC
    >>>>>>>>>>>>>>>>
241 CTGCGCGTACGTCTTCTACCGCCTCGGCTCCAGATCGAGCCCTCGCACAGCGCTCGC
301 CGCAGACTACGCCGTGCCCTACGCCGCCGCCAGGCGGTCAAGTGGGCCCTCTGGGCCCT
361 GTATTGGCACTGGCAGGGCGTCGCCCTCGCAGGATGGTGGTGCCTCGGGCACGAAGCGGG
421 GCACGGGTGCTCTCGGATTATAGCGTCGTGAACCACGTCCCTCGGCTACGGCCTGCACAC
481 CTTCTTCTGGTCCCGTACTACTCTGGCGCTCCACCCACCACGCGCACCACAAAGCAAC
541 CGGCTCCATCGAGCGCAGGAGAACTACGTCCCGCGCACGCGCACGGACTACGGCTCCC
601 GCCCGCCGCGGTGCGCCACGTACGACTACCACGACCTTTCGAGGAGACGCCGATCTA
    <<<<<<<<<<<<<<<<<
661 CAGCCTCGCGCATGCTCGCGATGCAGCTCCTCGGCTGGCACGCGTACCTGCTCTACAA
    <<<
721 CGCGCTCGGCTCCCCGATGTACCCCGAGGGCACGAACCACTTCTGGCCGCTCCTCGCCGCT
781 TTCAAGCCCCAGGAGCG
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	78	20	59.26	60.00	0.00	0.00	0.00	CCGTCTCAGCCTCTTCTAC
RIGHT PRIMER	506	20	58.71	55.00	0.00	0.00	0.00	AGGAGTAGTACGGGACCAGA
PRODUCT SIZE: 429, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 3.94								
2 LEFT PRIMER	13	20	59.54	60.00	0.00	0.00	0.00	CTCTACTTGCTGCTCCCTCC
RIGHT PRIMER	449	20	58.12	55.00	0.00	0.00	0.00	CGACGCTATAATCCGAGAGC
PRODUCT SIZE: 437, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

```

3 LEFT PRIMER      83  20  59.62  60.00  0.00  0.00  0.00 CTCAGCCTCTTCTACGACGG
  RIGHT PRIMER    509  19  58.89  63.16  2.64  0.00  0.00 GCCAGGAGTAGTACGGGAC
  PRODUCT SIZE: 427, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      68  20  59.83  60.00  0.00  0.00  0.00 CTCACCATGTCCGTCCTCAG
  RIGHT PRIMER    514  19  59.27  63.16  2.29  0.00  0.00 GGAGCGCCAGGAGTAGTAC
  PRODUCT SIZE: 447, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2325	0	0	0	0	890	0	121	879	0	0	7	18	0	410
Right	2394	0	0	0	0	772	0	84	1112	0	0	36	0	0	390

Pair Stats:

considered 339, unacceptable product size 331, primer in pair overlaps a primer in a better pair 530, ok 8
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA856.g1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	53	20	59.05	45.00	4.18	0.00	0.00	TGTTTGTACATGCGCCGAAA
RIGHT PRIMER	503	20	58.99	55.00	0.00	0.00	0.00	CGACCACTCCATTGCAGATG

SEQUENCE SIZE: 737
INCLUDED REGION SIZE: 737

PRODUCT SIZE: 451, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

1 CGAATGCGTCAAATGCAAGACCTTCCATGATGCCTGCCGACCTGGTACAACACTGTTTGT
>>>>>>>

61 CATGCGCCGAAAGTGAGAAACGAGTAAACGAAGAAGAAAAACACGGAAGAACGCGCCTT
>>>>>>>>>>>

121 AAAGAATACATAATGCGGTTGATGTGCGATGAGACAAATTATCCTGCTTGCGAGTTTGA

181 GACGGTGGAAACTGGGCGATGAACGGCAAGGAGCGATATGAATGCGAGTCGTAATCGGAG

241 AGCGGATGTAGAACAAAGAAGATGTCGTAATGTGCGTACAAAGAAGCGGTATCTGAAAAC

301 ATTCGTGAAAAGGCATGAGGACACGAGGCACGGGTATCTTTAGGGCTTCGTGCAGGGTG

361 TTCATGCGATGAATGCAAGGCCAAACGAGGCGACCAGGCATGCGATGCCAAGGCCCAAGC

421 TGACCGACATAGCAGGGCGGCGCAAAGCGGAGAGTTCTGTGCTCCTCGGAGCAGCGTTGTC

481 GTTCATCTGCAATGGAGTGGTCTGCTCATGCGCGCAGATAGATAGGCAGCGGCTGAATCAC
<<<<<<<<<<<<<<<<<<<<

541 GTGCGGTGGCGATGAGCACTGTCGCTGTGCCTCTCGACGTCTTGAGAACGTGGGAGCG

601 CTAGGGCACGCGCAAGCGTTCGAGGGCAAACCTTGTGCTCGGAGGGGACCTTGAAATGG

661 GCGCAATCCAGATAGAGTCTGGTTCGTGCCGAAGACCTCCATCTCGTCACCAGAAGCAA

721 AGTTGAGCGAAAAGGTG

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	235	20	58.98	55.00	0.00	0.00	0.00	TCGGAGAGCGGATGTAGAAC
RIGHT PRIMER	729	20	59.05	50.00	0.00	0.00	0.00	CGCTCAACTTTGCTTCTGGT
PRODUCT SIZE: 495, PAIR ANY_TH COMPL: 7.60, PAIR 3'_TH COMPL: 7.39								
2 LEFT PRIMER	213	20	58.59	50.00	15.08	0.00	0.00	GCGATATGAATGCGAGTCGT
RIGHT PRIMER	710	20	58.90	55.00	0.00	0.00	0.00	TGACGAGATGGAGGCTCTCG
PRODUCT SIZE: 498, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	169	20	58.98	50.00	0.00	0.00	0.00	TTGCAGTTTTGAGACGGTGG

RIGHT PRIMER 598 20 59.55 60.00 0.00 0.00 0.00 CTCCCACGTTCTCAGAGAC
PRODUCT SIZE: 430, PAIR ANY_TH COMPL: 1.75, PAIR 3'_TH COMPL: 3.46

4 LEFT PRIMER 272 20 58.58 50.00 0.00 0.00 0.00 GTGCGTACAAAGAAGCGGTA
RIGHT PRIMER 691 20 59.18 55.00 0.00 0.00 0.00 GGCACGAACCAGGACTCTAT
PRODUCT SIZE: 420, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high		high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1962	0	0	0	0	45	0	869	338	0	0	6	19	0	685
Right	2028	0	0	0	0	142	0	201	1069	0	0	10	0	0	606

Pair Stats:

considered 123, unacceptable product size 118, primer in pair overlaps a primer in a better pair 72, ok 5
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 418, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

3 LEFT PRIMER 363 20 58.69 50.00 0.00 0.00 0.00 TCGCATCTACCTCGTCGATT
RIGHT PRIMER 762 20 58.87 55.00 27.92 8.43 0.00 GACCCGGGGAAGATGTACAT
PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 16.91, PAIR 3'_TH COMPL: 5.75

4 LEFT PRIMER 117 20 59.23 55.00 0.00 0.00 0.00 CGCGTTCCAATATCTCGACG
RIGHT PRIMER 572 20 59.26 55.00 9.72 0.00 0.00 GTGGCCATCATCTCAACAGC
PRODUCT SIZE: 456, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	high
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	end
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2412	0	0	0	0	321	0	438	829	0	0	21	0	0	803
Right	2258	0	0	0	0	165	0	418	790	0	0	14	37	0	834

Pair Stats:

considered 470, unacceptable product size 463, primer in pair overlaps a primer in a better pair 99, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA1267.b1

Template masking not selected

No mispriming library specified

Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	280	20	59.02	50.00	0.00	0.00	0.00	AGAACATCCTCAGCAGCACT
RIGHT PRIMER	701	20	58.91	55.00	0.00	0.00	0.00	CAAGGCAATCAAGGGAGTCG

SEQUENCE SIZE: 753
INCLUDED REGION SIZE: 753

PRODUCT SIZE: 422, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

1 GTGTCTCCGTAGGTGCCAAAACCATTAAGAACAACCTACCCTCCAGCCAGACACAGCGTC

61 GCGAGTTCGACGAACCTCGATGCTCGCAGCCTTGCGCAGCGCATTGGGCAAGATTCTCCCGC

121 AAGCCACCGACGACATCGTCACTGTTCTCAAGAACAGCATCATCGGTGGTCTTACTGGTG

181 GCGCCGCTGTCGCCGCTGGCAACGCTGCCCTCGGCAATAACAAGCAGCGCGACGTCGCTC

241 ACACCCTTCCTTCGACACCATCGACATCGACCAGCTCAAGAACATCCTCAGCAGCACTG
>>>>>>>>>>>>>>>>>>>>>>>>>>>>

301 TTGGCCCTGCAACCCTCCCTATCGTCAAGGACAAGCGCAACTCAAGGATGACGACGTCG

361 TCGCTCTCAAGAGCATCATCGACAACCTCAGAGTCGGTGCTCCAGGCTTCGCTACCCACG

421 TTGATGCTCGCGCTTGGCGCCACTGGCAAGGGCATCCTGGGTACCGTCGCTGGCCTTG

481 CCGCGTCGTCGGCAGTTGAGCCCATCATCGACGGGATCAAGGGTCTCTTCGATCGCGACC

541 TCGATGCCGCCCTCGAAGCTCGTGAGCCCTTGTTGCCACCGAAAGGGTATTCTCGGCA

601 CCGTTGCTGGTCTTGGCGCTCGTCCGCGTTGAGCCCATCATCAACGGGATCAAAGTCT

661 TTTGATCGCGACCTGGACACCGACTCCCTTGATTGCCTTGAAGTCTTGCCAGCCCAG
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

721 GAGCTGAACGAGCTTGATTAATTGACGAATGAG

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	208	20	59.27	55.00	0.00	0.00	0.00	CCCTCGGCAATAACAAGCAG
RIGHT PRIMER	695	20	59.39	55.00	0.00	0.00	0.00	AATCAAGGGAGTCGGTGTC
PRODUCT SIZE: 488, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	162	20	59.10	55.00	0.00	0.00	0.00	ATCGGTGGTCTTACTGGTGG
RIGHT PRIMER	601	20	58.34	55.00	0.00	0.00	0.00	GTGCCGAGAATACCCCTTCC
PRODUCT SIZE: 440, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	28	20	59.02	55.00	0.00	0.00	0.00	AGAACAACCTACCCTCCAGC
RIGHT PRIMER	525	19	58.87	57.89	0.00	0.00	0.00	GACCCTTGATCCCCTGCAT

PRODUCT SIZE: 498, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 269 20 58.64 55.00 0.00 0.00 0.00 CGACCAGCTCAAGAACATCC
RIGHT PRIMER 713 20 59.90 50.00 0.00 0.00 0.00 GGCAAGCAAGTTCAAGGCAA
PRODUCT SIZE: 445, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high			
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2124	0	0	0	0	181	0	317	949	1	0	52	0	0	624
Right	2124	0	0	0	0	364	0	240	1026	0	0	21	0	0	470

Pair Stats:

considered 870, unacceptable product size 862, primer in pair overlaps a primer in a better pair 161, ok 8
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      235  20  59.15  50.00  0.00  0.00  0.00  ATCATCATCCCGGCCTTCAA
  RIGHT PRIMER     663  20  59.21  55.00  0.00  2.51  0.00  GTGCATCGTGTTCAGGAGTG
  PRODUCT SIZE: 429, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      232  20  59.15  50.00  0.00  0.00  0.00  TCAATCATCATCCCGGCCTT
  RIGHT PRIMER     676  20  58.56  50.00  0.00  0.00  0.00  TGCCGTAGTTCTTGTGCATC
  PRODUCT SIZE: 445, PAIR ANY_TH COMPL: 1.10, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2154	0	0	0	0	57	0	717	410	0	0	4	0	0	966
Right	2154	0	0	0	0	11	0	774	600	0	0	9	0	0	760

Pair Stats:

considered 91, unacceptable product size 84, primer in pair overlaps a primer in a better pair 54, ok 7
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA1597.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	98	18	59.65	61.11	0.00	0.00	0.00	AAAGACCCCGAGCAGCAG
RIGHT PRIMER	513	19	58.93	57.89	0.00	0.00	0.00	ATGGTGGTGGTAGTGGTGG

SEQUENCE SIZE: 712
INCLUDED REGION SIZE: 712

PRODUCT SIZE: 416, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 1.02

```
1 GGGCACGAGGGTGTTCGCGAGCTCGATGAAGGGCAAGGGCTCTACGCGGTCCGCGCAGCG

61 CAGCGCGCGTGCCTCCGCCTCGTTTGCGTCTCGTCAAAGACCCCGAGCAGCAGGATGC
    >>>>>>>>>>>>>>>>>>>>

121 GACCGGGTCGCGGTCTTCGCGCTTTCCCTCGGTGCGGTTAGCAGCTCGACGCTGAT

181 GCCTGGCGAGGCGCGCAGTATGGTGCAGGCGAAGCGGGCGAGCCGTCCGGACCGCC

241 GCGCTCGCGCGCAGAGCAGCGACTCGATCGCGAAGGGCAAGCGCAAGGCCGAGGACGT

301 CGACAGTACGCCCGGACCTACGGGGCTCGCCGCGCGGAGCTTCGCGATCCCGGCTGA

361 TCCACGCATCACCCATCGCCCGTGCAGGTTCTCGCGCGTGCCCTCGTCTACCACGCAA

421 GCGCGCCCGCTGTCCGCACCAACCAGCCAGCCCTCCGCGCAGGCTCCACCACCGC

481 ACAAGCACAGCCGCCACCACTACCACCACCATGGGCACCTGGTCTCCCGCAGTCTCT
    <<<<<<<<<<<<<<<<<<<<<<<

541 GCGCACCCTTCCACAGCCCGTCCCGCGCGCCCTCCGCGCGGAGGCTCGTCTCCCGC

601 CCACGTCGTCCCGCCCGCGTGGGTCTGCACCGCACACGCGCTCGAGGCGCGCACGA

661 TAGGCGGCGCAGCCTATCGCAGATCTCGATCCCGCTAAGCGCGCTCGTGACG
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	22	18	57.45	61.11	0.00	0.00	0.00	CTCGATGAAGGGCAAGGG
RIGHT PRIMER	421	18	59.03	61.11	0.00	0.00	0.00	CTTGCCTGGTGGTAGGACGA
PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	101	18	61.47	66.67	8.39	0.00	0.00	GACCCCGAGCAGCAGGAT
RIGHT PRIMER	528	18	59.73	66.67	7.64	0.00	0.00	GAGGACCAGGTTGCCCATG
PRODUCT SIZE: 428, PAIR ANY_TH COMPL: 7.39, PAIR 3'_TH COMPL: 0.00								

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1878	0	0	0	0	939	0	2	780	0	0	117	0	0	40
Right	1858	0	0	0	0	1277	0	22	460	0	2	39	7	0	51

Pair Stats:

considered 1780, unacceptable product size 1777, primer in pair overlaps a primer in a better pair 329, ok 3
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 459, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 61 20 60.11 60.00 0.00 0.00 0.00 CCTTACCGTCTCTGCCTTGG
RIGHT PRIMER 550 20 59.00 55.00 0.00 0.00 0.00 GTTGTAAGTCGCCGTGATCC
PRODUCT SIZE: 490, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2107	0	0	0	0	148	0	496	710	0	0	23	24	0	706
Right	2190	0	0	0	0	50	0	872	486	0	0	7	0	0	775

Pair Stats:

considered 963, unacceptable product size 956, primer in pair overlaps a primer in a better pair 135, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      103  20  58.97  55.00  0.00  0.00  0.00 CCAGCCATGCAGATTACACC
  RIGHT PRIMER     550  20  58.12  50.00  0.00  0.00  0.00 TTGTCGAAAAGTGGCTCTCC
  PRODUCT SIZE: 448, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      232  20  59.68  55.00  7.64  0.00  0.00 AGGCGCTTGGTATCGAGATC
  RIGHT PRIMER     663  20  58.75  50.00  0.00  0.00  0.00 AAGGGTCATTGTGCTTGCTC
  PRODUCT SIZE: 432, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	X	stab
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			
Left	2398	0	0	0	0	172	0	745	698	0	0	6	19	0	758
Right	2478	0	0	0	0	113	0	894	664	0	0	20	0	0	787

Pair Stats:

considered 340, unacceptable product size 333, primer in pair overlaps a primer in a better pair 104, ok 7
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA1892.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions
OLIGO start len tm gc% any_th 3'_th hairpin seq
LEFT PRIMER 47 18 59.31 66.67 0.00 0.00 0.00 GAGGGAGCAGGGAGGAGA
RIGHT PRIMER 198 20 59.19 50.00 0.00 0.00 0.00 TCCCATACAAAATGCCACGC
SEQUENCE SIZE: 334
INCLUDED REGION SIZE: 334

PRODUCT SIZE: 152, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 GACCCTGCCCTCGGGCAGCGCTACCGGAGAGCATCCTGAAGCCTGGAGGGAGCAGGGAG
  >>>>>>>>>>>>>>>>

61 GAGACGGACTCATTAAAGGAGTTCCTCGGACGGCCATCGAACTCGGATGCGTTCTTGAAG
  >>>>

121 GAGCTGTTTGGGAGCTCTGGGGCGAGTGC GAATTTGTGAGTGGGGGAGCGGTAGAATTGC
  <<

181 GTGGCATT TTTGTATGGGAACAAGGACATTATCTTAGGGGTGTTCTAAAAAAAAAAAAA
  <<<<<<<<<<<<<<<<<<<<

241 AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

301 AAAAAAAAAAAAAATTTAAAAAAAAAAAAAAGGGGGC
```

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	30	18	57.44	61.11	0.00	0.00	0.00	GAGCATCCTGAAGCCTGG
RIGHT PRIMER	183	19	58.99	57.89	0.00	0.00	0.00	CACGCAATTCTACCGCTCC
PRODUCT SIZE: 154, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 5.66								
2 LEFT PRIMER	51	18	60.04	66.67	0.00	0.00	0.00	GAGCAGGGAGGAGACGGA
RIGHT PRIMER	225	23	58.28	47.83	0.00	0.00	0.00	GGAACACCCCTAAGATAATGTCC
PRODUCT SIZE: 175, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1030	0	0	0	0	120	0	175	387	0	0	102	19	0	227
Right	1000	0	0	0	0	591	0	209	74	0	0	5	31	0	90

Pair Stats:

considered 17479, unacceptable product size 17475, primer in pair overlaps a primer in a better pair 548, ok 4
libprimer3 release 2.4.0

PRODUCT SIZE: 452, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

3 LEFT PRIMER 171 20 59.53 55.00 0.00 0.00 0.00 AGATTCTCCCGCAAGCTACC
RIGHT PRIMER 622 20 58.74 50.00 0.00 0.00 0.00 AGCGATCAAGGAGTCAGTGT
PRODUCT SIZE: 452, PAIR ANY_TH COMPL: 7.41, PAIR 3'_TH COMPL: 3.47

4 LEFT PRIMER 181 20 59.63 55.00 0.00 0.00 0.00 GCAAGCTACCGACGACATTG
RIGHT PRIMER 636 20 58.63 50.00 0.00 0.00 0.00 GCCAGCAAGTTAAGAGCGAT
PRODUCT SIZE: 456, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	high
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	end
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2448	0	0	0	0	81	0	379	1119	0	0	27	0	0	841
Right	2378	0	0	0	0	570	0	833	470	1	0	2	27	0	475

Pair Stats:

considered 207, unacceptable product size 201, primer in pair overlaps a primer in a better pair 92, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

RIGHT PRIMER 677 18 60.28 66.67 0.00 0.00 0.00 GAAGATCCGCCGCTCCAG
PRODUCT SIZE: 432, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high		high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2154	0	0	0	0	440	0	343	850	0	0	95	33	0	393
Right	2182	0	0	0	0	860	0	72	957	0	0	62	19	0	212

Pair Stats:

considered 10701, unacceptable product size 10693, primer in pair overlaps a primer in a better pair 1276, ok 8
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA2234.b1

Template masking not selected

No mispriming library specified

Using 1-based sequence positions

```
OLIGO      start len    tm    gc% any_th 3'_th hairpin seq
LEFT PRIMER  47  20   58.45 50.00 10.75 10.75  0.00 TGTATCCTATCGGCTGCGAT
RIGHT PRIMER 446  20   57.88 50.00  0.00  0.00  0.00 GTGTTCCACCAGCAGATGAT
SEQUENCE SIZE: 446
INCLUDED REGION SIZE: 446
```

PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 9.29, PAIR 3'_TH COMPL: 6.55

```
1 CATAGTGC GACTCCTCGCTGGACGGTCCAGTGGATCCTCCTTCTATGTATCCTATCGGC
  >>>>>>>>>>>>>>>>>>>>
61 TGCGATGATGAACAAAGTTCTTCATTGTGTCCGCTAGGATGAGTCTTGGCGCACACGATG
  >>>>>>>
121 CCAACTAGCAAGTTGGCGTCGTGTTTCCAGCCGGGAATTTGGCCTCCTGACCTTCTCCTA
181 GGCATGCAAGTTGCTTGTGCGAGAAGAGCCTGTGTGCCGCGCTAAGGCACGCTTGTGCGAT
241 GTGGATTTCGAAAACGATCTCCTCGCTGACATAGCTGCTGAGGCAAATTGCAAATTAATT
301 ACCCCAGGTCATAGTCATGCGGTGGGATTTGCGGTGCTTTAAACTCGCCGCTCTCCCT
361 CTGTTACACCCCTTCCCCACGATACGTTTCTTGTACTGTCAACCTTGTACAATACA
421 TCGAATATCATCTGCTGGTGGAACAC
  <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
```

KEYS (in order of precedence):

```
>>>>>> left primer
<<<<<<< right primer
```

ADDITIONAL OLIGOS

```
        start len    tm    gc% any_th 3'_th hairpin seq
1 LEFT PRIMER    41  23   58.32 47.83   0.00  0.00   0.00 CTTCTATGTATCCTATCGGCTGC
  RIGHT PRIMER  442  22   59.03 45.45   0.00  0.00   0.00 TCCACCAGCAGATGATATTCGA
  PRODUCT SIZE: 402, PAIR ANY_TH COMPL: 9.29, PAIR 3'_TH COMPL: 0.00
2 LEFT PRIMER    38  23   57.49 47.83   0.00  0.00   0.00 CTCCTTCTATGTATCCTATCGGC
  RIGHT PRIMER  446  23   58.80 43.48   0.00  0.00   0.00 GTGTTCCACCAGCAGATGATATT
  PRODUCT SIZE: 409, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00
```

Statistics

```
con  too  in  in  not  no  tm  tm  high  high  high  high  high
sid  many  tar  excl  ok  bad  GC  too  too  any_th  3'_th  hair-  poly  end
ered  Ns  get  reg  reg  GC% clamp  low  high  compl  compl  pin  X  stab  ok
Left  282  0  0  0  0  4  0  103  91  0  0  61  0  0  23
Right 282  0  0  0  0  25  0  212  0  0  0  0  0  0  45
```

Pair Stats:

considered 119, unacceptable product size 115, primer in pair overlaps a primer in a better pair 774, ok 4
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA2400.b1

Template masking not selected

No mispriming library specified

Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
-------	--------------	------------	-----------	------------	---------------	--------------	----------------	------------

LEFT PRIMER	167	20	59.45	55.00	0.00	0.00	0.00	AGCTCTCCAAATCTCAGGCC
-------------	-----	----	-------	-------	------	------	------	----------------------

RIGHT PRIMER	651	20	59.05	55.00	0.00	0.00	0.00	CTCGGGCTGGAATAACATGC
--------------	-----	----	-------	-------	------	------	------	----------------------

SEQUENCE SIZE: 762

INCLUDED REGION SIZE: 762

PRODUCT SIZE: 485, PAIR ANY_TH COMPL: 3.15, PAIR 3'_TH COMPL: 3.15

1 GCCATGGGGAACCTCACTGCGTTTGTTCGACCATGTCCGCCTCTACATCCACGCGTACACG

61 CTCGCCCTCTCAGCGTCATGGGCTCCATCTTCTACGGGTGGGACATCGGCCTCATCGGC

121 GCGTCATCTCCCTGCCGGCGTACCAGCAGTACTTTGGCGTCGACAAGCTCTCCAAATCT
>>>>>>>>>>>>>>>>>>>

181 CAGGCCGCGAATCTCAACGGGAACGTCGTGCCATCCTCCAGGCTGGCAGCTTCTTCGGG
>>>>>

241 GCGCTCAGTACGGGTTACTTCTCGGGCGGTTTGGGAGGAAGCCTGTCCTCCTTGCCTCG

301 GGCATCGTGATCATCATCGGGAGCGTGATTAGAGCATAGTAGGGCTGGGGAGCAGCCAA

361 TCTGTCCGCGCTCAGGGTGCTCTACTTTGGCCGATTTGTAGGCGGATTTGGCGTGGGCATG

421 GTGTCCGCGCTCGTCCCGTCTACGTCTCTGAATGTGTGCCAAGTCTATTCGCGGCCGG

481 TGCACGGGATGATCCAATTCGCAATAATGTCGGGATTATGCTGAGTTTCTGGGTCAAC

541 TTCGGCGTCCGCCAGCATGTGCCCTTCGGCGCTATGCAATGGCGGATCCCGTTCATTGTG

601 CAGATCATCCCAGGCTTCATATTTATTCTTGGCATGTTATTCCAGCCCAGTCCCCGCGC
<<<<<<<<<<<<<<<<<<<<<<<<<<<<

661 TGGCTCGTTGAACACGGAGAGCATGAGCGTGCGGCACGCGCGCTGGGCTTTGCGGCCGAA

721 AGCCGGCGGACGACCCTGCAGTGCTGGTTACCCTCGAGGAGA

KEYS (in order of precedence):

>>>>> left primer

<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
--	--------------	------------	-----------	------------	---------------	--------------	----------------	------------

1 LEFT PRIMER	39	20	59.26	55.00	13.44	0.32	0.00	CCTCTACATCCACGCGTACA
---------------	----	----	-------	-------	-------	------	------	----------------------

RIGHT PRIMER	474	20	59.27	55.00	0.00	0.00	0.00	GCGAATAGACTTGGGCACAC
--------------	-----	----	-------	-------	------	------	------	----------------------

PRODUCT SIZE: 436, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

2 LEFT PRIMER	87	20	58.81	55.00	0.00	0.00	0.00	CATCTTCTACGGGTGGGACA
---------------	----	----	-------	-------	------	------	------	----------------------

RIGHT PRIMER	546	20	59.41	55.00	0.00	0.00	0.00	GCCGAAGTTGACCAGAAAC
--------------	-----	----	-------	-------	------	------	------	---------------------

PRODUCT SIZE: 460, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

3 LEFT PRIMER	8	20	59.41	55.00	0.00	0.00	0.00	GGAACCTCACTGCGTTTGTG
---------------	---	----	-------	-------	------	------	------	----------------------

RIGHT PRIMER 412 20 59.26 50.00 0.00 0.00 0.00 CGCCAAATCCGCCTACAAAT
PRODUCT SIZE: 405, PAIR ANY_TH COMPL: 0.80, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 148 20 58.51 50.00 10.09 10.09 0.00 CAGTACTTTGGCGTCGACAA
RIGHT PRIMER 603 20 59.27 55.00 1.92 1.92 0.00 CTGCACAATGAACGGGATCC
PRODUCT SIZE: 456, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	poly	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	X	stab	ok
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			
Left	2178	0	0	0	0	154	0	176	1205	0	0	17	0	0	626
Right	2178	0	0	0	0	526	0	385	757	0	0	2	0	0	508

Pair Stats:

considered 773, unacceptable product size 768, primer in pair overlaps a primer in a better pair 33, ok 5
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA2867.g1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	242	20	59.05	50.00	0.00	0.00	0.00	GAAGCGGTGGTGGTATTGTTGT
RIGHT PRIMER	660	20	59.00	55.00	12.83	12.83	0.00	GGAAAGTCAAGTCGATCGGC

SEQUENCE SIZE: 731

INCLUDED REGION SIZE: 731

PRODUCT SIZE: 419, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

1 GGCATCTATACCAATACATATTGGATGTCATCAAAGGAAAACGACACGGAATACAGGTGC

61 TTATAGGTGCTTATGCTTCTTCTATCTCCACTCTACGAATTTGTCCAGGCTCACTCAG

121 GGCCGATGAGTAAACAGGACACTTCCATTATGCCGCTTTGACAGTCGCCTCTGCCTCTT

181 TCTCGTCGACCTCCCCGAAGATGTTAATGCTCCATTTGGGCGTGTAGTTGATCGGGATGT

241 TGAAGCGGTGGTGGTATTGTTGTGCCCCGACGGCGGAGACCTTCTGGTAGTCTCTCGGAGA
 >>>>>>>>>>>>>>>>>>>>>>

301 GCTCGACTTGCTTAAAGTTTGAATAATACGCTCCTGCTGTATGCTCTTTGGGATAACAG

361 AGTATCCGCGGTGCGCACCCAGGCAACGAGAACCTGAGCGGGAGTCGCGCCGATCTTCT

421 TCGCATCTCTGGATCTCGGGATAGTCGGTAAGCTTCGGTTTGCCAACCAATGTTTC

481 CCAGGGGGGAGTACCCGTGATATGAATGTTCTCCTTCTTGCACTAGCTCGT

541 CCTGCGGAAGCAGCGGATGCGCCTCAATCTGGTTGGCAGTGGCTTCACGCCAGTTGCCT

601 CAACGATGGCCTTGATATACTCGATCGTGAAGTTAGACACGCCGATCGACTTGACTTTCC
 <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

661 CGTGTCAAGCAGTTTATCATAGCCTTCCACGTGGTGACAAGCGATGTCTCGGTGTCAAG

721 TGCAACTTCGC

KEYS (in order of precedence):

>>>>> left primer
 <<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	239	20	59.05	50.00	0.00	0.00	0.00	GTTGAAGCGGTGGTGGTATTGT
RIGHT PRIMER	723	20	58.93	55.00	0.00	0.00	0.00	GCACTTGACACCGAGACATC
PRODUCT SIZE: 485, PAIR ANY_TH COMPL: 14.95, PAIR 3'_TH COMPL: 3.01								
2 LEFT PRIMER	187	20	58.89	55.00	0.00	0.00	0.00	CGACCTCCCGAAGATGTTA
RIGHT PRIMER	665	20	59.25	50.00	0.00	0.00	0.00	ACACGGGAAAGTCAAGTCGA
PRODUCT SIZE: 479, PAIR ANY_TH COMPL: 16.37, PAIR 3'_TH COMPL: 5.01								
3 LEFT PRIMER	220	20	58.79	55.00	0.00	0.00	0.00	GCGTGTAGTTGATCGGGATG
RIGHT PRIMER	674	20	58.69	50.00	0.00	0.00	0.00	AACTGCTTGACACGGGAAAG

PRODUCT SIZE: 455, PAIR ANY_TH COMPL: 8.87, PAIR 3'_TH COMPL: 1.92

4 LEFT PRIMER 97 20 58.48 50.00 0.00 0.00 0.00 ACGAATTTGTCCAGGCTCAC
RIGHT PRIMER 506 20 59.04 55.00 14.22 0.00 0.00 TCATATCACGGCGTACTCCC
PRODUCT SIZE: 410, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1992	0	0	0	0	105	0	834	389	0	0	5	0	0	659
Right	1925	0	0	0	0	74	0	506	586	0	0	13	20	0	726

Pair Stats:

considered 230, unacceptable product size 224, primer in pair overlaps a primer in a better pair 121, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

4 LEFT PRIMER 65 20 58.56 50.00 0.00 0.00 0.00 CCACAAATTCGTCGGCCTA
 RIGHT PRIMER 528 20 58.93 55.00 0.00 0.00 0.00 GCTCCTCTCAAAGTCAAGCG
 PRODUCT SIZE: 464, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	ok	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	
Left	1830	0	0	0	0	365	0	215	751	0	0	9	0	0	490
Right	1830	0	0	0	0	32	0	162	981	0	0	10	0	0	645

Pair Stats:

considered 553, unacceptable product size 548, primer in pair overlaps a primer in a better pair 16, ok 5
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1217	0	0	0	0	222	0	403	294	0	0	11	37	0	250
Right	1350	0	0	0	0	565	0	22	588	0	0	37	0	0	138

Pair Stats:

considered 6366, unacceptable product size 6360, primer in pair overlaps a primer in a better pair 2069, ok 6
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

4 LEFT PRIMER 291 20 59.04 50.00 0.00 0.00 0.00 GTTGTGGCGAATCTGGGTT
 RIGHT PRIMER 692 20 59.75 55.00 0.00 0.00 0.00 TGACCTTGGTATGAAGCCGG
 PRODUCT SIZE: 402, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2049	0	0	0	0	40	0	656	634	0	0	12	3	0	704
Right	2052	0	0	0	0	23	0	527	666	0	0	13	0	0	822

Pair Stats:

considered 2019, unacceptable product size 2009, primer in pair overlaps a primer in a better pair 228, ok 10
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA3348.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seq
LEFT PRIMER	36	20	58.51	55.00	4.93	4.29	0.00	TTCCTGGGAGAAGATCGTCC
RIGHT PRIMER	481	20	58.97	60.00	0.00	0.00	0.00	CGGAGAGGAGCAAGAGGTAG

SEQUENCE SIZE: 646
INCLUDED REGION SIZE: 646

PRODUCT SIZE: 446, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 GACCTCCTTGCGGACCTCGTCGACAACCCAGACTTTTCTGGGAGAAGATCGTCCCGTC
   >>>>>>>>>>>>>>>>>>>>>>>>>>>>

61 TACGAGCAGATCGAGAAGCGCTCGAAAGACTCCCAGAACCCCATCTCCATCCGCGCCATC

121 TCCAGACCCCGCGCACCCAGCGCTGGTCCTCCGTGCGAGAGCAGTCGTACAAGCAGGCC

181 GGCTTTGCCAAGTACGACGACGTCAACGGCGGCCCCATGCTCGGCTACACCGAGCTCGTC

241 GAGAACGTGACGACAAGGGCACCCGCTCTCCGCCAACGGCTACTTTGGAGCCACCGTC

301 GATCCCGCAAAGACGCGTCTCGAGATATGGACGGGGCTCCGCGTGAGCAAGATCCTCTTC

361 AGCGAGGAGCAGCCGCCAGGGCGATTGGCGTCCAGACGAGCGCCGGCGCGGTGCACGCC

421 AAGCGAGAAGTGATCCTCACCGCCGGCGGATCCAGAGCGCTACCTTTGCTCCTCTCC
   <<<<<<<<<<<<<<<<<<<<<<<<<<<<

481 GGCATCGGCCCGCCGCCATCTCGCGAACACGGCGTCTCCCTCGTCGTCGACTCGCCC
   <

541 ACCATCGGGCAACAGATGTGGGAGCACCCCTTCATGGACTCTCCTTCGACTGAAGGAC

601 GAGTACCGCGCCGACACCGTGAAGACTCTCCAGCGTGAAGACCG
```

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seq
1 LEFT PRIMER	158	20	58.66	55.00	0.00	0.00	0.00	CAGAGCAGTCGTACAAGCAG
RIGHT PRIMER	642	20	59.39	55.00	0.00	0.00	0.00	CTTCACGCTGGAGAGGTCTT
PRODUCT SIZE: 485, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	155	19	59.05	52.63	0.00	0.00	0.00	TCGCAGAGCAGTCGTACAA
RIGHT PRIMER	606	20	58.55	55.00	0.00	0.00	0.00	GTACTCGTCTTCAGTCGGA
PRODUCT SIZE: 452, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	84	20	58.94	55.00	0.00	0.00	0.00	GAAAGACTCCCAGAACCCCA
RIGHT PRIMER	557	19	60.08	57.89	0.00	0.00	0.00	ATCTGTTGCCCGATGGTGG
PRODUCT SIZE: 474, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
4 LEFT PRIMER	21	21	59.13	52.38	0.00	0.00	0.00	CGACAACCCAGACTTTTCTTG
RIGHT PRIMER	437	20	60.11	55.00	0.00	0.00	0.00	AGGATCACTTCTCGTTGGC
PRODUCT SIZE: 417, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 8.77								

Statistics

	con sid ered	too many Ns	in tar get	in excl reg	not ok reg	bad GC%	no GC clamp	tm too low	tm too high	high any_th compl	high 3'_th compl	high hair- pin	poly X	high end stab	ok
Left	1482	0	0	0	0	283	0	108	681	0	0	49	0	0	361
Right	1482	0	0	0	0	485	0	55	622	0	0	35	0	0	285

Pair Stats:

considered 1306, unacceptable product size 1299, primer in pair overlaps a primer in a better pair 314, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 444, PAIR ANY_TH COMPL: 0.94, PAIR 3'_TH COMPL: 7.70

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1926	0	0	0	0	307	0	184	913	0	0	15	0	0	507
Right	1926	0	0	0	0	712	0	78	835	0	0	11	0	0	290

Pair Stats:

considered 1203, unacceptable product size 1196, primer in pair overlaps a primer in a better pair 125, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA3562.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	269	20	58.94	55.00	0.00	0.00	0.00	CGCGACTCTTGAGTTCCTTG
RIGHT PRIMER	686	20	59.08	55.00	18.94	0.00	0.00	GATCGCAGCGTTCAGGTTAG

SEQUENCE SIZE: 789
INCLUDED REGION SIZE: 789

PRODUCT SIZE: 418, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

1 GCGTGAACGTGGCGAATCCGCTGTTGCCCTCAAATCAGCCTATGAAGGTGACGTCTCTG

61 GCCATGCGTTCGTCAAGCAGGCCACGAGGGTGTCCCCTTCGCCAACGCTGTCGCCAACG

121 TCGCTTTCAACAAGGCTGGCAAGGTTGTTCGCGTTCGGCTCCTCGTTCGTCAAGGCCGACA

181 ACTTGCCCTCGTCCACCCCTCCATCACTGTCGAGCAGGCCATCGCCACCGCCGAGGAGA

241 CCCTCGACGGCAAGTACAACGACTGGCCCGCGACTCTTGAGTTCCTTGCTCTCGACGACG
>>>>>>>>>>>>>>>>>>>>>>

301 GCAGTGCCGCTCTCGTTCACGTGTTCAAATTCAAAACGAGGCGACCGGCGCGTGGGTTG

361 AGGCGTTCGTTCGACGCCACAGCAACAAGGTTGTCTCGATCACTGACTTCGTTGCCAAAG

421 CCTCGTACCGTGTCTTCCCATCACTAAAGAGGTTTTGACCGACGGCTTCGAGACCGTCA

481 CCGACCCCAGGACACCGTTCGCTTCCCTCCGGCTGGCATAGCACGGGCTCGACGACCA

541 CGACCACAACCTGCCGGTAACAACGTCGTTCGCGTACAAGGGTTCCAGAGCAAGACCGCCT

601 CCCAGTCTTCTCCGGCTCAACTTCATCTACACCCAAAACCTGCAAACGCCCTACTA

661 CCTCTGCTAACCTGAACGCTGCGATCACCAACGCGTTCTACATTGTCAATTCGTTACG
<<<<<<<<<<<<<<<<<<<<<<

721 ACTTTTCTTACCGTACGGCTTACGAGAGCGCTTCAACTTTCCAGACCAACTTCGG

781 CAGGGTGGT

KEYS (in order of precedence):

>>>>> left primer
<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	246	20	59.22	55.00	0.00	0.00	0.00	GACGGCAAGTACAACGACTG
RIGHT PRIMER	647	20	59.15	50.00	0.00	0.00	0.00	TGCAGGGTTTTGGGTGTAGA
PRODUCT SIZE: 402, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	279	20	59.48	55.00	0.00	0.00	0.00	GAGTTCCTTGCTCTCGACGA
RIGHT PRIMER	770	20	59.12	55.00	0.00	0.00	0.00	GGTCTGGAAAGTTGAAGGCG
PRODUCT SIZE: 492, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

```

3 LEFT PRIMER      329  20  59.48  50.00  0.00  0.00  0.00  AATTCAAAACGAGGCGACCG
  RIGHT PRIMER     765  20  59.20  55.00  7.64  4.69  0.00  GGAAAGTTGAAGGCGCTCTC
  PRODUCT SIZE: 437, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      125  20  59.25  50.00  3.38  0.00  0.00  TTTCAACAAGGCTGGCAAGG
  RIGHT PRIMER     563  20  59.69  55.00  0.00  0.00  0.00  GTTGTTACCGGCAGTTGTGG
  PRODUCT SIZE: 439, PAIR ANY_TH COMPL: 13.18, PAIR 3'_TH COMPL: 5.29

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2274	0	0	0	0	321	0	221	1159	0	0	17	19	0	537
Right	2306	0	0	0	0	137	0	439	878	0	0	6	15	0	831

Pair Stats:

considered 230, unacceptable product size 221, primer in pair overlaps a primer in a better pair 132, ok 9
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 404, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 92 20 59.69 50.00 0.00 0.00 0.00 TTTTCGTGCTCTTTTCGTGCC
RIGHT PRIMER 548 20 59.33 55.00 0.00 0.00 0.00 CTGTGGTGAAGTTTGCTGGG
PRODUCT SIZE: 457, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2000	0	0	0	0	173	0	604	620	0	0	19	19	0	565
Right	1867	0	0	0	0	14	0	611	505	0	0	8	54	0	675

Pair Stats:

considered 1252, unacceptable product size 1247, primer in pair overlaps a primer in a better pair 93, ok 5
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA3999.b1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	214	20	59.05	50.00	0.00	0.00	0.00	GGTTTCATCACGCACACCTT
RIGHT PRIMER	620	20	59.02	55.00	0.00	0.00	0.00	CCCCACTTCAAGCAGGAGTA

SEQUENCE SIZE: 742
 INCLUDED REGION SIZE: 742

PRODUCT SIZE: 407, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

1 GCCTGGTGAAGGCCGCTGTACATCGACCCCTTACTTCAAGAGCCAAGCCGTCACCGAT

61 GTGATCACCCCGTCGCGCGCGAGGTCGCTCGTTGGCCTCTTGTTGGCATACTGGTGG

121 GTCCAAGGTTTGACCTTCACTGGTATTTGGGTCGTCGGTCACGAGTGTTGTCATGGCGCT

181 TTCTCCGCCAACAAAGCATATCAACAATGTCAATTGTTTTCATCACGCACACCTTCCTTTGG
      >>>>>>>>>>>>>>>>>>>>>>>>>

241 ACTCCGTCTTTAGTTGGAGGATCTCGCACCATCGCCACCACAGCAACCATGCGTCCATG

301 GAGCGTGACGAGGTTTACGTTCCCAAGACCCGCACTGACCTCGGCATCCCTCTCAAGGAG

361 AACAGCAAGATTGACTGGGAAGAGCACTTTGGTGACACTCCGATCTACACGCTCTACATG

421 CTCCTTCGGCAGCAATTCCTCGCGTTCCCGGCTATCTTTTGTTC AACGTATCGGGCCAG

481 AAGACCTACCCGAAATGGACCAACCACTTTGATCCCAACTCCATTCTTTCAACGAAGGAA

541 CAGCGCAACTCGGTATCTCTTAACATCGGCATCATTTTCGATGATCCTTGCGGTCCAG

601 TACTCCTGCTTGAAGTGGGGCTCCTCCGAGGTCGTC AAGTACTACGGCCTCCCCTGGCTT
      <<<<<<<<<<<<<<<<<<<<<<<<<

661 CTCGTACGCCACTGGTTATCATGATCACTTACCTCCACCACACCGACACCTCCCTCCCT

721 CACTACCGCAACAAAGAGTGGA
```

KEYS (in order of precedence):
 >>>>> left primer
 <<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	298	20	59.11	50.00	10.10	0.00	0.00	ATGGAGCGTGACGAGGTTTA
RIGHT PRIMER	705	20	58.95	55.00	0.00	0.00	0.00	GGTGTGGTGGAGGTAAGTGA
PRODUCT SIZE: 408, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	313	20	58.85	55.00	0.00	0.00	0.00	GTTTACGTTCCCAAGACCCG
RIGHT PRIMER	736	20	58.84	55.00	0.00	0.00	0.00	CTTTGTTGCGGTAGTGAGGG
PRODUCT SIZE: 424, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	34	20	59.31	50.00	0.00	0.00	0.00	TACTTCAAGAGCCAAGCCGT
RIGHT PRIMER	478	20	58.84	50.00	0.00	0.00	0.00	GGCCCGATACGTTGAACAAA
PRODUCT SIZE: 445, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

4 LEFT PRIMER 179 20 59.12 50.00 0.00 0.00 0.00 CTTTCTCCGCCAACAAAGCAT
 RIGHT PRIMER 653 20 59.54 60.00 0.00 0.00 0.00 GGGAGGCCGTAGTACTTGAC
 PRODUCT SIZE: 475, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	ok	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	
Left	2020	0	0	0	0	155	0	383	777	0	0	5	10	0	690
Right	2058	0	0	0	0	39	0	542	632	0	0	18	0	0	827

Pair Stats:

considered 1780, unacceptable product size 1770, primer in pair overlaps a primer in a better pair 279, ok 10
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA4010.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seq
LEFT PRIMER	135	20	58.99	55.00	0.00	0.00	0.00	CGTCCC GG CCTATCTTTTG
RIGHT PRIMER	544	20	59.01	55.00	0.00	0.00	0.00	GGGGAAGAAGTGGTGGATGA

SEQUENCE SIZE: 749
INCLUDED REGION SIZE: 749

PRODUCT SIZE: 410, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 CGAGGTTTACGTTCCCAAGACCCGCACTGACCTCGGCATCCCTCTCAAGGAGAACAGCAA
61 GATTGACTGGGAAGAGCACTTTGGTGACTCCGATCTACACGCTCTACATGCTCCTTCG
121 GCAGCAATTCTCGGTTCCCGGCTATCTTTGTTCAACGATATCGGGCCAGAAGACCTA
    >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
181 CCCGAAATGGACCAACCACTTTGATCCCAACTCCATTCTTTCACCAAGGAACAGCGCAA
241 CTCGGTCATCCTCTAACATCGGCATCATTTTCGATGATCCTTGGCGTCCAGTACTCCTG
301 CTTGAAGTGGGGCTCCTCCGAGGTCGTAAGTACTACGGCCTCCCCTGGCTTCTCGTCAG
361 CCACTGGTTCATCATGATCACTTACCTCCACCACACCGACACCTCCCTCCCTCACTACCG
421 CAACAAAGAGTGGAAGCTACCAGCGCGCTGCGTACCGTGCACCGACCCCTTCCTCGG
481 CTGGTGGGGCCGCTTCTTCTTACACGACGTGCGCACTACCACGTATCCCACTTCTT
    <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
541 CCCCAAGATGCCCTGGTACCACGGTGGAGGAGGCGACCAAGTACTTGAAGGAGTTCATCGG
    <<<<
601 CGAGCACTACGCCTGGTCTGACGAGCCCGTCTTCCAATCGCTCTGGAGGAACTACAACGA
661 GTGCCAGTTCGTTGAGGATGAGGGTATGTCTTGTCTACCGCAACAAGCAGGGCCGTGC
721 CTACCGCCAGCCCACTGCTCGCTACCGGG
```

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seq
1 LEFT PRIMER	88	20	58.98	55.00	0.00	0.00	0.00	CACTCCGATCTACACGCTCT
RIGHT PRIMER	509	20	59.02	55.00	0.00	0.00	0.00	CGTCGTGTAAGAAGAAGCGG
PRODUCT SIZE: 422, PAIR ANY_TH COMPL: 15.67, PAIR 3'_TH COMPL: 15.67								
2 LEFT PRIMER	5	20	58.85	55.00	0.00	0.00	0.00	GTTTACGTTCCCAAGACCCG
RIGHT PRIMER	436	20	58.98	50.00	0.00	0.00	0.00	GTTCCACTCTTTGTTGCGGT
PRODUCT SIZE: 432, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								


```

3 LEFT PRIMER      218  20  58.85  55.00  0.00  0.00  0.00 CTCTTCACCAAGGAACAGCG
RIGHT PRIMER      666  20  58.95  50.00  0.00  0.00  0.00 TGGCACTCGTTGTAGTTCCT
PRODUCT SIZE: 449, PAIR ANY_TH COMPL: 2.23, PAIR 3'_TH COMPL: 2.23

4 LEFT PRIMER      99   20  59.10  50.00  0.00  0.00  0.00 ACACGCTCTACATGCTCCTT
RIGHT PRIMER     585  20  59.10  55.00  7.48  0.00  0.00 AAGTACTTGGTCGCCTCCTC
PRODUCT SIZE: 487, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	stab
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	ok
Left	2100	0	0	0	0	43	0	547	644	0	0	3	0	863
Right	2100	0	0	0	0	295	0	287	844	0	0	1	0	673

Pair Stats:

considered 37, unacceptable product size 31, primer in pair overlaps a primer in a better pair 30, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      331  20  59.11  55.00  0.00  0.00  0.00 TCTACGAGGACACCAGCAAG
  RIGHT PRIMER     770  20  59.24  55.00  0.00  0.00  0.00 GGGCTGGAGATAGTGCATGA
  PRODUCT SIZE: 440, PAIR ANY_TH COMPL: 14.81, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      170  20  59.02  50.00  0.00  0.00  0.00 AGGCTTCGACATGGACAAGA
  RIGHT PRIMER     653  20  58.67  50.00  0.00  0.00  0.00 CATGCCCTTTGTGAACCTGT
  PRODUCT SIZE: 484, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 10.96

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	X	stab
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			
Left	2123	0	0	0	0	214	0	295	932	0	0	10	50	0	622
Right	2310	0	0	0	0	315	0	275	981	0	0	3	0	0	735

Pair Stats:

considered 300, unacceptable product size 289, primer in pair overlaps a primer in a better pair 47, ok 11
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA4098.g1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	196	20	59.00	55.00	0.00	0.00	0.00	GTGCGGATCGAGGAAAAGAC
RIGHT PRIMER	595	20	58.97	55.00	0.00	0.00	0.00	GGAAGGGATTCAATGCGTC

SEQUENCE SIZE: 747
INCLUDED REGION SIZE: 747

PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
 1 AGTCAGAAAAATGGCGATAATCAAATAATGCGGTCTATATATAGAACTTAGAGCAAGGT
61 TAGGTTTTAGATCTATGGAAAAGTAACAGTAATGAGACATAAGCTGGTGGTCGTGGGCC
121 CCGCTGACATGGGTAATATACAACAAAGTTCGAAGTCTAGGGTAGTGGTATCTGTAAGA
181 AGAAACGAAAATCATGTGCGGATCGAGGAAAAGACGATCCTTTGACCACGTTCTCGTATT
    >>>>>>>>>>>>>>>>>>>>>>>>>>>>
241 TTATCTTCGAGAGCCTCGAATCGAGGGTCTGGGAGAACGTCGCGCCAGTCATCACCGTAC
301 AGGACAACTCTTTTCATCGAGGGGAAGAGATCAGGATCGTAAGCGGCAAAATGCTCCTCT
361 ATGCACCTCCACTCCTCCGGATCCGTGTCGTGGGAATGAATGCTCAAGTTGGGGTGTGCA
421 TGGAGGCCGACGCTATGGAGTGAAGGATGCGGCCTCGTATAATGTGGAGGGGCGGTGAAG
481 AAGATGTAATAGTTGAGCTCGCAAAGATGAGGGCACGAGGCAACGACAGTCGCGAGGTGA
541 TCCTCTGTGAGGAAACGCATATGGCTTCCGAGTTGGACGCATTGAATCCCTTCCCCGAAC
    <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
601 GTCTCCCATATATTGTCCAAGCCTGATATGGCGCAGCGCTCGACAATGACGTGCGAC
661 AGCGAGGGGAGAGACCATACGCAGACCTGGCGAACGAAAATAGGGTTCACGTTCCGCAA
721 CGAAGAACCTTGAGCGCAGGGAGCTCG
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	191	20	59.25	50.00	0.00	0.00	0.00	ATCATGTGCGGATCGAGGAA
RIGHT PRIMER	689	20	58.89	55.00	0.00	0.00	0.00	CAGGTCTCGTATGGTCTCT
PRODUCT SIZE: 499, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	96	20	58.64	55.00	0.00	0.00	0.00	GACATAAGCTGGTGGTCTGTG
RIGHT PRIMER	587	20	58.91	50.00	0.00	0.00	0.00	ATTCAATGCGTCCAACCTCGG
PRODUCT SIZE: 492, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	317	20	59.07	55.00	0.00	0.00	0.00	TCGAGGGGAAGAGATCAGGA
RIGHT PRIMER	737	20	59.41	50.00	0.00	0.00	0.00	GCGCTCAAGTTCTTCTGTTT

PRODUCT SIZE: 421, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 214 20 58.21 50.00 0.00 0.00 0.00 ACGATCCTTTGACCACGTTC
RIGHT PRIMER 705 20 58.99 55.00 0.00 0.00 0.00 CCCTATTTTCGTTCCGCCAGG
PRODUCT SIZE: 492, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high			
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2048	0	0	0	0	331	0	984	226	0	0	11	17	0	479
Right	2088	0	0	0	0	37	0	436	827	0	0	7	0	0	781

Pair Stats:

considered 290, unacceptable product size 284, primer in pair overlaps a primer in a better pair 218, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA4192.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	70	20	59.02	50.00	0.00	0.00	0.00	TTGGAGCGTGATCTTGGAGT
RIGHT PRIMER	543	20	59.01	55.00	6.13	0.00	0.00	GTCGCGGTCTTGAGTTCATC

SEQUENCE SIZE: 744
INCLUDED REGION SIZE: 744

PRODUCT SIZE: 474, PAIR ANY_TH COMPL: 8.61, PAIR 3'_TH COMPL: 0.00

```
1 ATTCGCCTGAACAACGGTGGCGCAAACATTGCCCGTAGAACCGCCTGTGCAAGCCAATGT

61 GTTCGGTAATTGGAGCGTGATCTTGGAGTCCGCGGGCAATGCTTGCCTTATTCGCCTGAA
  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

121 CAACGGTGGCGCAAACACTGGCTCGATCGCTAACGGTGGTGGGCCTTCGGTGGTTCGCT

181 CGCTGTCTCTCAGGCTAATGCCGCTGCTACTGGTGGTGGTGGCTGGCTGGTGGTGGCTGCTAA

241 CGCGACCACCGGCTGCCGCCACGACAGCAAGACCGCCGGTAAAGCTGGAGGCAAAAC

301 TCGGCTGCGACTGGCGCAAGGCTGCGGCTGGAGGCAAGGTTGCGGCTACAGCTGGAAA

361 GGCTGCAAGGGTGCGAAGGCTGCTCGTGAAGTCGTGAGTCCCACCCTTCTTCCTTC

421 GCTTTCTGCTCGCCGTCAGGCAATAGACGACCTCGTTGCAAACGTGAGGCCATGGACGC

481 TGAAATTTGGCCAAGCGTCAGAAGCTCACCCTGATGATGATGACTCAAGACCGC
  <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

541 GACTGGCACTGCCATCGACATTCGATTGATGCCTTGCTGGTGCAGTTGATGAGAGTGC
  <<<

601 ATTGGCGGTAACCTCAACCAAGGCTGCCGGTGGTCTCTCTCACGGATCAACAGGCCGTTGA

661 TATCAAGAAGGCTGTACAGAAGCCATTGAGCAGCCTTCATCATCATGGCGAGCACTCA

721 AGTTGACGCTGGTGCAAACGGTCA
```

KEYS (in order of precedence):

>>>>> left primer
<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	49	20	59.12	50.00	0.00	0.00	0.00	GCAAGCCAATGTGTTCGGTA
RIGHT PRIMER	497	20	59.21	50.00	20.91	5.38	0.00	GCTTGGCCAAAATTCAGCG
PRODUCT SIZE: 449, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	24	20	58.84	50.00	0.00	0.00	0.00	AAACATTGCCCGTAGAACCG
RIGHT PRIMER	503	20	58.67	45.00	20.91	5.81	0.00	TCTGACGCTTGGCCAAAAT
PRODUCT SIZE: 480, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 1.75								
3 LEFT PRIMER	134	20	59.47	50.00	11.09	0.00	0.00	AACACTGGCTCGATCGCTAA
RIGHT PRIMER	600	20	58.93	55.00	0.00	0.00	0.00	GCACTCTCATCAACGTGACC
PRODUCT SIZE: 467, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

4 LEFT PRIMER 44 20 59.61 50.00 0.00 0.00 0.00 CCTGTGCAAGCCAATGTGTT
 RIGHT PRIMER 488 20 59.47 50.00 6.96 0.00 0.00 AAATTTTCAGCGTCCATGGCC
 PRODUCT SIZE: 445, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	ok	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	
Left	2070	0	0	0	0	271	0	120	1191	0	0	111	0	0	376
Right	2070	0	0	0	0	22	0	361	846	0	1	13	0	0	827

Pair Stats:

considered 1874, unacceptable product size 1861, primer in pair overlaps a primer in a better pair 626, ok 13
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 408, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.84

4 LEFT PRIMER 176 20 59.05 55.00 15.93 0.00 0.00 AGGTAGAGATAACGCGAGCC
RIGHT PRIMER 575 18 58.59 61.11 0.00 0.00 0.00 GCGCCCGTTCCACTATTC
PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 2.38

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1768	0	0	0	0	583	0	456	345	0	0	44	52	0	288
Right	1948	0	0	0	0	684	0	81	901	0	0	2	7	0	273

Pair Stats:

considered 904, unacceptable product size 898, primer in pair overlaps a primer in a better pair 289, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

2 LEFT PRIMER 35 20 58.79 50.00 0.00 0.00 0.00 AGCCGGGTCTGAATCATCTT
 RIGHT PRIMER 514 18 60.74 66.67 0.00 0.00 0.00 CACCTGCTGCACGTCCTC
 PRODUCT SIZE: 480, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2272	0	0	0	0	428	0	238	1023	0	0	4	13	0	566
Right	2316	0	0	0	0	1969	0	1	319	0	0	19	0	0	8

Pair Stats:

considered 73, unacceptable product size 70, primer in pair overlaps a primer in a better pair 53, ok 3
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

4 LEFT PRIMER      173  20  58.90  60.00  0.00  0.00  0.00 CCTCTCTTGCTCCTCTCCGTC
RIGHT PRIMER      613  20  58.66  50.00  0.00  0.00  0.00 AGCCCGTCTCAGAGTTCTTT
PRODUCT SIZE: 441, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1727	0	0	0	0	2	0	622	336	0	0	2	19	0	746
Right	1726	0	0	0	0	33	0	559	439	0	0	12	19	0	664

Pair Stats:

considered 162, unacceptable product size 153, primer in pair overlaps a primer in a better pair 70, ok 9
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      305  20  59.41  60.00  0.00  0.00  0.00  CTACCGACGATTCTCCTCCG
  RIGHT PRIMER     705  20  58.97  60.00  0.00  0.00  0.00  GTCGGTGATGGAGAGGGTAG
  PRODUCT SIZE: 401, PAIR ANY_TH COMPL: 9.25, PAIR 3'_TH COMPL: 15.07

4 LEFT PRIMER      30   20  58.83  50.00  0.00  0.00  0.00  TCAAATCACCATCCGCAACC
  RIGHT PRIMER     465  20  59.48  60.00  0.00  0.00  0.00  GTGAGTGACCGTGAGAGAGG
  PRODUCT SIZE: 436, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	stab
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	ok
Left	1932	0	0	0	0	590	0	156	772	0	0	4	0	410
Right	1748	0	0	0	0	277	0	295	551	0	0	11	43	571

Pair Stats:

considered 65, unacceptable product size 58, primer in pair overlaps a primer in a better pair 89, ok 7
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPA4929.b1

Template masking not selected

No mispriming library specified

Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	71	20	58.91	55.00	0.00	0.00	0.00	GACTTCATCGGCAACTTCCC
RIGHT PRIMER	486	20	59.12	55.00	0.00	0.00	0.00	CTCGTCTCTGGTGAAGTCGT

SEQUENCE SIZE: 774
INCLUDED REGION SIZE: 774

PRODUCT SIZE: 416, PAIR ANY_TH COMPL: 10.28, PAIR 3'_TH COMPL: 1.68

```
1 CGACATGTCCTCATCTACCTGCCCACGCCACAACCAAGGATCTCTCCATCCTCGAGCC
61 CGAGTTTCGCGACTTCATCGGCAACTTCCCAGACACGACCGAGACCGCAGAGACCGGCGA
  >>>>>>>>>>>>>>>>>>>>>>>>>>>>
121 TGTCGTCGTCACACTTCATGCGTCCATCCC GCCCGCCGACACAACGATCCGCGTGTGAT
181 CAAGCAAGACATCCAAGTCTCCAGCCCCAACGCTCCATCCACACAGCCGCCCGTCAACGT
241 GCGCGTCTACAGTCCAAGGACGTCGATCCAGCGGACCGCTCCCCGTGCTGCTATGGAT
301 GCACCACGGTGGATTTTTCTCCGCGGGACCACTACGCCTGGATCCCTTCTGCAGCGCGAT
361 CGCGGCCGAGGCGAACATCATCATGATCGCACCCGCGTATCGCCAAACACCCGAGCACCC
421 CTTCCCCGACCGTTCGACGACTGCTACGAGGTGCTGCGCTGGATCAGACTTCACCAGA
  <<<<<<<<<<<<<<<<<<<<<<<<<<<<
481 GACGAGTCGCTACGCGATCGACAGCACCAAGTTT GCGGTCGGCGGGACGTCCGTGGGCGG
  <<<<<<<
541 CACGGTGGCAATCGGGCTCGCGCTCAAGCTGCGGAGGAGACGGGAGCACGAAAGCGAT
601 CAGCCTGCTGCTCCTCGACGACACCAGCTTCACCGACAAGCCCAACACGTA CTACTACGTT
661 CCACAACCCGATCAACAAGATCTGGAACGCGAACGT CACGCGCTACGCGTGGCAGTTTTTA
721 CCTCCGAACGGCTCGGACGCGCTCGACCCCGT CACGCGCAGCTACGTCGTGGC
```

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	41	20	59.11	60.00	6.99	0.00	0.00	GATCTCTCCATCCTCGAGCC
RIGHT PRIMER	489	20	59.12	55.00	0.00	0.00	0.00	CGACTCGTCTCTGGTGAAGT
PRODUCT SIZE: 449, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.25								
2 LEFT PRIMER	74	20	59.31	50.00	0.00	0.00	0.00	TTCATCGGCAACTTCCGAGA
RIGHT PRIMER	514	20	58.85	50.00	9.36	9.36	0.00	AAACTTGGTGTGTCGATCG
PRODUCT SIZE: 441, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	332	20	59.61	60.00	9.90	0.00	0.00	CTACGCCTGGATCCCTTCTG
RIGHT PRIMER	731	20	59.21	55.00	0.00	0.00	0.00	CGTTCGGGAGGTAAAAGTGC

PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 242 20 59.76 55.00 0.00 0.00 0.00 CGCGTCTACAGTCCAAAGGA
RIGHT PRIMER 654 20 58.85 55.00 0.00 0.00 0.00 GAGTACGTGTTGGGCTTGTC
PRODUCT SIZE: 413, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high				
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	X	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			stab	ok
Left	2170	0	0	0	0	396	0	190	1010	0	0	11	19	0	544	
Right	2250	0	0	0	0	546	0	134	1057	0	0	1	0	0	512	

Pair Stats:

considered 162, unacceptable product size 155, primer in pair overlaps a primer in a better pair 120, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 400, PAIR ANY_TH COMPL: 2.29, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 26 20 59.11 55.00 0.00 0.00 0.00 AGCTACCACGACAAGTACCC
RIGHT PRIMER 451 20 57.85 50.00 20.98 0.00 0.00 TCACGATCGGATACCAATGC
PRODUCT SIZE: 426, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high			
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1853	0	0	0	0	45	0	404	726	0	0	9	20	0	649
Right	1858	0	0	0	0	103	0	444	662	0	0	33	19	0	597

Pair Stats:

considered 208, unacceptable product size 200, primer in pair overlaps a primer in a better pair 105, ok 8
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

RIGHT PRIMER 452 20 58.71 55.00 0.00 0.00 0.00 GTTCAAGGCGGAGTAATCGG
PRODUCT SIZE: 443, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	stab	ok
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1429	0	0	0	0	31	0	540	242	0	0	11	52	0	553
Right	1501	0	0	0	0	183	0	476	424	0	0	22	43	0	353

Pair Stats:

considered 344, unacceptable product size 338, primer in pair overlaps a primer in a better pair 181, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

RIGHT PRIMER 703 20 58.84 50.00 0.00 0.00 0.00 ATTTTCGTTCCGCCAGGTCTG
PRODUCT SIZE: 490, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1799	0	0	0	0	331	0	897	201	0	0	14	20	0	336
Right	1854	0	0	0	0	46	0	390	759	0	0	5	0	0	654

Pair Stats:

considered 162, unacceptable product size 156, primer in pair overlaps a primer in a better pair 509, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB622.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seq
LEFT PRIMER	56	20	59.18	55.00	9.46	1.25	0.00	AGCACTGTACCGGATGAGTC
RIGHT PRIMER	459	20	58.71	50.00	0.00	0.00	0.00	CGACCCTGACAAAACGAACA

SEQUENCE SIZE: 652
INCLUDED REGION SIZE: 652

PRODUCT SIZE: 404, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 AGCCGTCTTACTCAACCGAGCTAAGGGCTTAATGACCATCGGTACCATCTTCAAAGCAC
      >>>>>

61 TGTACCGGATGAGTCGGATGAAGAACGAAGAGAGCTCGAACGCATGGTACTGAAGCCGC
    >>>>>>>>>>>>>>>>

121 GGCGAACAAAGCCAAAGCACAGGACCGCCAAGGGCAGCACAGAGGAGCGAAGCCCCCTAC

181 GGACGGGGCTCACGACCCAGCTGCCAAAGCCGAAGCTTCTCGGCTGAGCCAACGCCAAC

241 CGCCTGATTCTTTCGCTCTCGTTGTATGCAATTGAATTACAGTACACATCTCTTCCCCTC

301 CCTTTTTACCATCCTAGACAATGTCTACTCAGTTGGTTTAGTCTTAGCGTTAGAGTCTC

361 TTTGCTTCATCAGCTCGCACGAATCTCTGCGGTTATATTTGGATATCTGATCTACTC

421 ACATTGTGTCCCTTGTTTCTGTTCTGTTTGTGTCAGGGTCGAATCCCGATCACTCTCGACAC
      <<<<<<<<<<<<<<<<<<<<<<

481 GCTCGCCTGCCTTCTGTTCTGTCGTCCGTTGGTCTCCATCATTTCTTTTAGGATT

541 TCGGTTTTCTTCTCTTTTGTGTTAGCTTCTGATGCCCCACTCGCTCTACGTACGCACCT

601 CGGTATTCTAGATTCTATGCTCCAATAATGGTACTTCTGTTCTTCTGTTGA
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seq
1 LEFT PRIMER	91	18	59.03	55.56	8.37	0.00	0.00	AGAGCTCGAACGCATGGT
RIGHT PRIMER	583	20	59.17	55.00	0.00	0.00	0.00	GAGTGGGGCATCAGAAGCTA
PRODUCT SIZE: 493, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	75	21	58.81	52.38	0.00	0.00	0.00	CGGATGAAGAACGAAGAGAGC
RIGHT PRIMER	505	19	58.94	57.89	0.00	0.00	0.00	CGAACGAACAGAAGGCGAG
PRODUCT SIZE: 431, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	52	21	58.58	47.62	9.46	0.00	0.00	CAAAAGCACTGTACCGGATGA
RIGHT PRIMER	508	19	59.22	57.89	0.00	0.00	0.00	GAGCGAACGAACAGAAGGC
PRODUCT SIZE: 457, PAIR ANY_TH COMPL: 6.09, PAIR 3'_TH COMPL: 6.60								
4 LEFT PRIMER	49	21	58.51	47.62	9.46	0.00	0.00	CTTCAAAGCACTGTACCGGA
RIGHT PRIMER	463	21	58.59	47.62	0.00	0.00	0.00	GATTCGACCCTGACAAAACGA
PRODUCT SIZE: 415, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

Statistics

con too in in not no tm tm high high high high

	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1482	0	0	0	0	161	0	285	574	0	0	134	10	0	318
Right	1518	0	0	0	0	83	0	775	290	0	0	41	0	0	329

Pair Stats:

considered 3758, unacceptable product size 3746, primer in pair overlaps a primer in a better pair 880, ok 12
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB887.g1

Template masking not selected

No mispriming library specified

Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	232	20	59.09	55.00	5.00	0.00	0.00	CGTAGATCGCCAGAACGTTG
RIGHT PRIMER	696	20	58.57	50.00	0.00	0.00	0.00	ACTCGACGATTCACAAGCC

SEQUENCE SIZE: 728
INCLUDED REGION SIZE: 728

PRODUCT SIZE: 465, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 AATGGCAAACAATGTGTCTTATTGACTTTGATGTACTTGGTACGTATGCGACGTGTA AAA
61 TAAGTAAGCACAACTAAATTACTCTAGATCATGATTCCAATGTCCACCTTCGTATCTGA
121 TAGTTCGTCAACTTTTCGGATGTGATTGTACACTTCTCTACTTGCGAGACAGGAGACTCT
181 TCAGGGGCCCAATCAGGCTGCCCTGCGAATACGGAAGAACCATGTCAAGCCGTAGATCG
    >>>>>>>>
241 CCAGAACGTTGAACGCAAGGTACGCCACATCAGGCCGAAGTTCTCCAGCGCTCGGAGT
    >>>>>>>>>>
301 AGAAGATGTTGAAGCTACGCCAAGGAAGTGGTCGGTCGTGCGGGCAGAGCAGTAATTGC
361 AGACGTCCGTGCATCTGGGTTGGTGGTGTACCCTCCCACTGTCGAGATGAACGAGTTCA
421 AATATTGCCCGCAAGTTTGGCCGGATGGTGGAGGCATGTGGACGAATTCCTTATCAGCAC
481 AATTAATCTCGTGCCACCAAGTGCTTGGCCAAGAAGACCTCCGATGAGATAAGAGTAGG
541 GAGAGACACGGTACATCCACCGCCACCATCCGAGCTGTCTGAAAGGCTGAAGGACACCGT
601 TGAATGTGATGACGAAAGAGAACAGGAACTGAAAAGCAGCGCCGCGATCTCGGAGCTGG
661 GAGACATCGCAGCGACGGCTTGTGAAATCGTCGAGTAGTACATGGGGAAGACGATGCCGA
    <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
721 GCATGAGA
```

KEYS (in order of precedence):

>>>>> left primer
<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	289	20	59.33	55.00	2.64	0.00	0.00	AGCGCTCGGAGTAGAAGATG
RIGHT PRIMER	718	20	59.53	55.00	0.00	0.00	0.00	GGCATCGTCTTCCCATGTA
PRODUCT SIZE: 430, PAIR ANY_TH COMPL: 1.30, PAIR 3'_TH COMPL: 1.30								
2 LEFT PRIMER	178	19	59.00	57.89	27.72	14.77	0.00	TCTTCAGGGGCCAATCAG
RIGHT PRIMER	584	20	59.02	50.00	0.00	0.00	0.00	TTTCAGACAGCTCGGATGGT
PRODUCT SIZE: 407, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	235	20	58.57	50.00	5.00	0.00	0.00	AGATCGCCAGAACGTTGAAC

RIGHT PRIMER 707 20 58.33 55.00 0.00 0.00 0.00 CCCCATGTACTACTCGACGA
PRODUCT SIZE: 473, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 175 19 59.00 57.89 27.72 8.89 0.00 GACTCTTCAGGGGCCCAAT
RIGHT PRIMER 593 20 58.84 55.00 0.00 0.00 0.00 CCTTCAGCCTTTCAGACAGC
PRODUCT SIZE: 419, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	poly	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	X	stab	ok
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			
Left	1974	0	0	0	0	205	0	780	460	0	0	26	0	0	503
Right	1974	0	0	0	0	65	0	616	643	0	0	0	0	0	650

Pair Stats:

considered 800, unacceptable product size 791, primer in pair overlaps a primer in a better pair 75, ok 9
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB993.g1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions
 OLIGO start len tm gc% any_th 3'_th hairpin seq
 LEFT PRIMER 127 20 59.97 60.00 0.00 0.00 0.00 CTCCTATCACGATGCCCCAC
 RIGHT PRIMER 626 18 59.05 61.11 0.00 0.00 0.00 CATCACCAACCAACGC
 SEQUENCE SIZE: 701
 INCLUDED REGION SIZE: 701

PRODUCT SIZE: 500, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

  1 ATCACGACTCCATCGTCTCTCTCTGTACCATTGTATTACATACCTGCCGCACATAAT

 61 GCCACATCTTCGCACTGACTCGTCCCGCCGCTGCCTGTGCCTATGCTTGTGCCCCGCGCG

121 TCTGATCTCCTATCACGATGCCCCACCGACGCGCTGCGCGTGTGCCGCGCCGCGCGCGCG
    >>>>>>>>>>>>>>>>>>>>

181 CCCGCCGATATGCTCCCGCGCCAGCGCGCGGCTGCTGCCGCGGTTCAGCAGCGGGTC

241 GAGCGGCGCGAGCGCCACCGCGCGTCCGCGCGCGGGGGCTCTGCGCAGTAGAT

301 CGCGAGCATCGCCGAGGAGAGGTAGGTGTGGTACGGGTCGGGATGCTGCCCGGCGCCTT

361 CGCGATCCCGCCAACCGGAAGTGGCAGCGCGCGACGAAGCGTGCAGCGCGCGCGCGTTC

421 GACGAGCGTGTCTGCGCCGAGCAGCGCGCGCGCCGCCAGACAGCGCAGCGCGCGTTC

481 GTCTGCGGCCTTGGCCGTCGCGCCGAGACCGCGCGCGCGCGCGCGCGCGCGCGCGTTC

541 CCACCGCACGGTGTGTGCGCGTGGGCGGGGGGGAGCGGGGGGGTGGGGCGCGGGTGT

601 TGGTGTGGCGTTGGTGGTGGTGGTGGTGGTGGTGGTGGTGGTGGTGGTGGTGGTGGTGGT
    <<<<<<<<<<<<<<<<<<<<

661 CGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTG

```

KEYS (in order of precedence):
 >>>>> left primer
 <<<<<< right primer

ADDITIONAL OLIGOS

```

           start len    tm    gc% any_th 3'_th hairpin seq
1 LEFT PRIMER           226    18    60.81   66.67   0.00   0.00   0.00   GTTCAGCAGCGGGTTCGAG
  RIGHT PRIMER           673    20    58.41   50.00   0.00   0.00   0.00   AACACCAACACCGTCATCAG
  PRODUCT SIZE: 448, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

2 LEFT PRIMER           130    20    61.74   60.00   0.00   0.00   0.00   CTATCACGATGCCCCACCGA
  RIGHT PRIMER           629    18    57.21   55.56   0.00   0.00   0.00   CGTCATCACCAACCAACAA
  PRODUCT SIZE: 500, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1812	0	0	0	0	965	0	176	392	0	0	18	0	0	261
Right	1811	0	0	0	0	960	0	148	438	0	0	32	2	0	179

Pair Stats:
 considered 41578, unacceptable product size 41574, primer in pair overlaps a primer in a better pair 2839, ok 4

libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 448, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 3 20 59.27 55.00 0.00 0.00 0.00 CTTGCTCACCATCTGCGAAG
RIGHT PRIMER 440 20 59.26 55.00 0.00 0.00 0.00 CGATAGCAGAGCAGACAGGT
PRODUCT SIZE: 438, PAIR ANY_TH COMPL: 7.53, PAIR 3'_TH COMPL: 7.53

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high		high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2196	0	0	0	0	122	0	691	616	0	0	17	0	0	750
Right	2116	0	0	0	0	92	0	666	592	0	0	5	19	0	742

Pair Stats:

considered 109, unacceptable product size 100, primer in pair overlaps a primer in a better pair 172, ok 9
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB1368.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seq
LEFT PRIMER	181	20	59.03	50.00	0.00	0.00	0.00	TTGCCATTCCCTGTTCTTGC
RIGHT PRIMER	680	20	59.05	50.00	0.00	0.00	0.00	AAAGGGAAGAAAGCACTGCC

SEQUENCE SIZE: 771
INCLUDED REGION SIZE: 771

PRODUCT SIZE: 500, PAIR ANY_TH COMPL: 0.93, PAIR 3'_TH COMPL: 5.83

```

1  GAGATTCTCGGCACGATGCCTTGCTGAGGGCCTTCTATAGGCTTCTTCCCAACTCGGGA
61 GACTACTATGCGTCTACGCGCCTTTGCCAAAGACACCGTCATGAAGCGGGTCGCCAAAGGC
121 TCTATGATTGAGACATCTTTTACTTCTAATGGATGAAGACGGTCTGGAGGAAAGGCC
181 TTGCCATTCCCTGTTCTTGTGCGCAGGCAAGTTTGCCATCGTGGCCGGGTGGGACACC
   >>>>>>>>>>>>>>>>>>>>>>
241 AGTGGCGTCACTCTGGTCAATATCTTCTATTACTCTCGAATATGAAGGCCTACAGG
301 CGTCTTCAAGCAGAGATCGACAGAGCGGTATCGGAGTCTGCGATCGATCCGGCTGCATTA
361 AACACATTACCATATCTCAACGCTGTCAATAACGAGACATTGAGATTACAGCCCCTTGTA
421 CCCAATGGCGTCCAGCGAGTCTTTCTCCGAAGACAGGCGGCACGTTAGTCTGCGGAAAC
481 TACATCCCGCCCAACAGACCGTCAAGTCTCGAACTATAGCGTTCAAAGGGATCCTCTG
541 AACTTCTCTCCAGCCCCGACGGTCTTGGCCAGAACGTTGGCTTATCGCTGACGCAGAC
601 AAGGCCGAAGCTCCGTCAGCGACTGGATTTTCATCCGAGCCAGCTGTCACCTGCCTGAAC
661 CGCAGTGTCTTCTTCCCTTTTCAGCTATGGCCCGACAACTGCGCTGGCAAGACGCTGGCA
   <<<<<<<<<<<<<<<<<<<<<<<<
721 ATGATCGAAATGCGTGTCTCGTGTATCTCCATGATGCGCGTTCGAGGCCG

```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seq
1 LEFT PRIMER	39	20	59.10	55.00	0.00	0.00	0.00	TAGGCTTCTTCCCAACTCGG
RIGHT PRIMER	495	20	58.91	55.00	0.00	0.00	0.00	GTTGGGCGGGATGTAGTTTC
PRODUCT SIZE: 457, PAIR ANY_TH COMPL: 7.29, PAIR 3'_TH COMPL: 12.66								
2 LEFT PRIMER	345	20	58.99	50.00	0.50	0.00	0.00	CGATCCGGCTGCATTAAACA
RIGHT PRIMER	754	20	58.81	50.00	0.00	0.00	0.00	TCATGGAGATCACGACAGCA
PRODUCT SIZE: 410, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	300	20	59.08	55.00	0.00	0.00	0.00	GCGTCTTCAAGCAGAGATCG
RIGHT PRIMER	730	20	59.27	50.00	0.00	0.00	0.00	TTTCGATCATTGCCAGCGTC

PRODUCT SIZE: 431, PAIR ANY_TH COMPL: 13.06, PAIR 3'_TH COMPL: 13.06

4 LEFT PRIMER 243 20 58.74 50.00 0.00 0.00 0.00 TGGCGTCACTCTGGTCAATA
RIGHT PRIMER 660 20 59.41 55.00 13.48 13.48 0.00 GTTCAGGCAAGTGACAGCTG
PRODUCT SIZE: 418, PAIR ANY_TH COMPL: 17.59, PAIR 3'_TH COMPL: 11.78

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2232	0	0	0	0	132	0	643	745	0	0	18	0	0	694
Right	2232	0	0	0	0	45	0	415	971	0	0	20	0	0	781

Pair Stats:

considered 263, unacceptable product size 257, primer in pair overlaps a primer in a better pair 183, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      33  20  58.91  55.00  0.00  0.00  0.00 GCCCTTGACAGTCGGAAATC
  RIGHT PRIMER    455  20  58.13  50.00  0.00  0.00  0.00 TCCTTGATCTCATCCACGGT
  PRODUCT SIZE: 423, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER     230  21  58.92  52.38  4.66  0.00  0.00 CTGGGATTTGGTCTGACGAAC
  RIGHT PRIMER    677  20  59.20  55.00  0.00  0.00  0.00 CCAACAATCTTCTCGCCAC
  PRODUCT SIZE: 448, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2185	0	0	0	0	210	0	600	679	0	0	49	39	0	608
Right	2322	0	0	0	0	75	0	808	609	0	0	26	0	0	804

Pair Stats:

considered 2317, unacceptable product size 2312, primer in pair overlaps a primer in a better pair 357, ok 5
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB1601.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	116	20	60.11	55.00	15.27	0.89	0.00	ATTCATGAGTGGCACCTCG
RIGHT PRIMER	544	22	59.17	45.45	0.00	0.00	0.00	TCGAGTCCATGAGCTAAGTTGT

SEQUENCE SIZE: 545
INCLUDED REGION SIZE: 545

PRODUCT SIZE: 429, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

1 CCAAGGCGTCGGGCACGGCCTCTAGCACAGGCAGTGCCAAGGCGTCGTCGTCTGCGAGTC

61 CGTCGTCTCGAATACTTCTACTTCGGGTTCTTGAATGGCGGATGTCGAAAGTATTCA
>>>>

121 TGAGTGGCACCTCGGAGCGTTGGTTGTCTGCGTCCGCTCGCGCTTCTCTGTAGTGACGT
>>>>>>>>>>>>>>>>>>

181 CATATCCTATCGTATGTTTCATCCGAGCCACCACCCTTACTAGCATAACAATTCTTCTCATA

241 CCCCTGCACTCCGCGTTTCCCCACGTCACCCTAATCCTGCATCTTCTCGTTACAAAAG

301 ATGAGCAACGTCAAGAACACCTCCACCACCGGATGGACGGGGCGTTTATGCTTGACCCT

361 CTCCCAGATTTGTCTATGTTTTCCCCTCTACTTTTCGCGCTTTCACCTCGTCTGTTCTC

421 CTCGATGTGTTTGACAGCTTTTGACCTGGAGATATGGATTACATAGTGATTGCTAGCA

481 TTCGCCAGTACCATATTTACTGAAAAGTGGACGATTTTTATACAAGTCTAGTCTCATGGAC
<<<<<<<<<<<<<<<<<<<<

541 TCGAG
<<<<

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	75	21	57.43	47.62	0.00	0.00	0.00	ACTTCTACTTCGGGTTCTTCG
RIGHT PRIMER	501	23	57.39	43.48	0.00	0.00	0.00	GTAATATGGTACTGGGCGAATG

PRODUCT SIZE: 427, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	end	ok	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly		
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	
Left	876	0	0	0	0	76	0	164	428	0	0	133	0	0	75
Right	831	0	0	0	0	89	0	378	104	0	0	60	16	0	184

Pair Stats:
considered 17857, unacceptable product size 17855, primer in pair overlaps a primer in a better pair 2389, ok 2
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      196  20  59.17  55.00  0.00  0.00  0.00  TATGCCTTACCTCCAACCGG
RIGHT PRIMER      638  20  59.03  50.00  0.00  0.00  0.00  ATTCCAAGGTTTCCAACGCC
PRODUCT SIZE: 443, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      11  20  58.90  55.00  0.00  0.00  0.00  TCTGCGTGCCATCTCTCTC
RIGHT PRIMER     457  20  58.89  45.00  0.00  0.00  0.00  AAAACAAGACCGGCAGCTTT
PRODUCT SIZE: 447, PAIR ANY_TH COMPL: 4.58, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1899	0	0	0	0	19	0	380	697	0	0	4	18	0	781
Right	1968	0	0	0	0	43	0	605	519	0	0	3	0	0	798

Pair Stats:

considered 65, unacceptable product size 57, primer in pair overlaps a primer in a better pair 51, ok 8
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB2431.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	183	20	58.99	55.00	2.24	0.00	0.00	GTCACTCATCACGGCCATT
RIGHT PRIMER	661	20	59.06	55.00	0.00	0.00	0.00	GGATGAGGAAGATGCAAGCG

SEQUENCE SIZE: 787
INCLUDED REGION SIZE: 787

PRODUCT SIZE: 479, PAIR ANY_TH COMPL: 11.96, PAIR 3'_TH COMPL: 0.00

1 ACCGACCCTACGACTCCGTTTAACTTAACCTCCTTAAGGTGTTAGTGGTTCCTCCACACC

61 ATAGTCATGTGCTCCCAAGACGCCTCGGCCTTCATCCTGCCAGTGCAGTCCAAAGCA

121 CGCAAATTCCTCCTGTTGGCGCTTTTCTGTATCGCACAAATTCATCGATACGTTTCAAGTATC

181 TCGTCACTCATCACGGCCATTCCAAAAATCTCTGAGGACCTGGGGTTGAGCACAGCTCAG
>>>>>>>>>>>>>>>>>>>>

241 GCTACATGGTGTCTTTCTGGTTTTCAGCTTACATTGCGTCACTTTCTGCTCGTGAGCGGA

301 AGGGTCAGTGTGTACAGTCCAAAGGTCGTGTTTCGTGGCGGTATCGGCGCCTCGGT

361 TTCATCTCGCTAGGCGCTGGTTTCTCAAGAGCAAAATCCCACTCATCGTCTTCTGTCGCA

421 CTTGGTGGCATAGCTGGTTTCGATGACTATCCCATCTGCCTTGGCACTATTGTGCTATG

481 TTCCTCAACCACTGGAACAATCGCGTGCATCTCCCTCTTCGGAGGCTGTGGCGCTGTT

541 GGAAATGTCGCTGGTCTGATCATTGGTGGTGTCTTCACTCAATTCGCGACCTGGCACTGG

601 GTTTTCTGGTTGTGACCATCGTCGGTGGCCATCTTTTCGTTGCATCTTCTCATC
<<<<<<<<<<<<<<<<<<<<

661 CCAGCACAAACCGAAATCGGGTGAGCCACGGATGCAGAGCTTAAGCGACTCGATGCGCTC
<

721 GGTGTCTCCATCTTACAGTTCGCTCGTCTCTGATTTTCCATGACTCAGGCTCGT

781 CATCAGC

KEYS (in order of precedence):

>>>>> left primer
<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	116	20	59.12	50.00	0.00	0.00	0.00	AAGCACGCAAATTCCTCCTG
RIGHT PRIMER	568	20	58.99	55.00	0.09	0.00	0.00	CACCAATGATCAGACCAGCG
PRODUCT SIZE: 453, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	63	20	59.10	55.00	0.00	0.00	0.00	AGTCATGTGCTCCCAAGAG
RIGHT PRIMER	501	20	58.78	50.00	9.54	0.00	0.00	TTGTTCCAGTGGTTGAGGGA
PRODUCT SIZE: 439, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

```

3 LEFT PRIMER      132  20  58.77  50.00  7.64  0.00  0.00  0.00 CCTGTTGGCGCTTTTCTGTA
  RIGHT PRIMER     612  20  58.88  50.00  0.00  0.00  0.00  0.00 AAACCAGAAAACCCAGTGCC
  PRODUCT SIZE: 481, PAIR ANY_TH COMPL: 20.73, PAIR 3'_TH COMPL: 20.73

4 LEFT PRIMER      59   20  58.88  55.00  0.00  0.00  0.00  0.00 CCATAGTCATGTCGTCCCCA
  RIGHT PRIMER     505  20  58.77  50.00  9.54  0.00  0.00  0.00 GCGATTGTTCCAGTGGTTGA
  PRODUCT SIZE: 447, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2248	0	0	0	0	76	0	695	616	0	0	50	19	0	792
Right	2248	0	0	0	0	19	0	450	832	0	0	4	19	0	924

Pair Stats:

considered 1637, unacceptable product size 1628, primer in pair overlaps a primer in a better pair 149, ok 9
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB2669.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

```
OLIGO          start  len  tm  gc%  any_th  3' th  hairpin  seq
LEFT PRIMER    187   20  58.92  55.00  0.00   0.00    0.00  CAAGTGCATCAACCTCTCCG
RIGHT PRIMER    616   20  58.90  55.00  0.00   0.00    0.00  ACGTTAGCAGAGAGAGAGGC
SEQUENCE SIZE: 786
INCLUDED REGION SIZE: 786
```

PRODUCT SIZE: 430, PAIR ANY_TH COMPL: 9.51, PAIR 3'_TH COMPL: 9.11

```
1 CAACACGCTCTCCCTCCACTCGTCGGCGAACGTCGGCATGGAGAACAACGACGTGACGCT
61 CTTCTTCGGGCTGTCGGGGACGGGCAAGACCACGCTCTCCGCGGACCCGCGCCGGCTGCT
121 CATCGGCGACGACGAGCACGTCTGGTCCGACACGGGCGTGTTCAACATCGAGGGCGGGTG
181 CTACGCCAAGTGCATCAACCTCTCCGCCGAGAAGGAGCCGGAGATCTTCAACGCGATCCG
   >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
241 CTTCGGGAGCATCCTCGAGAACGTCGTCTACAACCCCGTCTCGCGCGTGCCCGACTATGA
301 CGACGTCGGCATCACGGAGAACACGCGCTGCGCGTACCCGATCGAGTTCATCCCCAACGC
361 GCAGATCCCGTGCGCCGTGACCGCCAGCCGAGCAACATCATCATGCTCACCTGCGACGC
421 CTTTGGCGTCTCCCGCCCGTCAGCAAGCTCACCCCGAGCAGGCCAGCTACCACTTCTCT
481 CGCGGGCTACACCTCGAAAACCCCGGCACGGAAGACGGTGTGCTGGAGCCCATCCCCAC
541 CTTCTCCACGTGCTACAGCGGCCCTTATCGTCCTCCACGTGCGTGTCCCTCTCGCCT
   <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
601 CTCTCTGCTAACGTCCTGACCCCCCGCCCCGCTTTTCCAGCCCGGCCGCTACGCCT
   <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
661 CGATGCTCGCGGAGCGCATGGCGAAGCACAAAGTCGACTGCTGGCTCATCAACACCCGG
721 CTGGACGGGCGGCAAATTCGGCACGGGACGCGCTGCCCGCTCAAATACACGGGCGCATC
781 GTCGAC
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

```
start  len  tm  gc%  any_th  3' th  hairpin  seq
1 LEFT PRIMER    211   20  58.88  55.00  5.05   0.00    0.00  GAAGGAGCCGGAGATCTTCA
  RIGHT PRIMER    623   20  58.83  55.00  0.00   0.00    0.00  GGTCAGGACGTTAGCAGAGA
  PRODUCT SIZE: 413, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00
2 LEFT PRIMER    258   20  59.40  55.00  0.00   0.00    0.00  AGAACGTCGCTACAACCCC
  RIGHT PRIMER    701   20  59.49  55.00  13.01  0.00    0.00  CAGTCGACCTTTGTGCTTCG
  PRODUCT SIZE: 444, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 1.01
```

```

3 LEFT PRIMER      157  19  59.21  57.89   0.69  0.00   0.00  CGTGTTCAACATCGAGGGC
  RIGHT PRIMER     558  20  59.40  55.00  18.88  0.00   0.00  CTGTAGCACGTGGAGAAGGT
  PRODUCT SIZE: 402, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      335  20  58.67  55.00  18.66  0.00   0.00  TACCCGATCGAGTTCATCCC
  RIGHT PRIMER     771  19  59.28  57.89   0.00  0.00   0.00  CGTGTATTTGAGCGGGCAG
  PRODUCT SIZE: 437, PAIR ANY_TH COMPL: 8.83, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2322	0	0	0	0	559	0	77	1203	0	0	11	0	0	472
Right	2183	0	0	0	0	592	0	75	1101	0	0	5	39	0	371

Pair Stats:

considered 911, unacceptable product size 899, primer in pair overlaps a primer in a better pair 405, ok 12
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB3344.g1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seq
LEFT PRIMER	226	20	59.00	55.00	0.85	0.85	0.00	CACGAATTGGTACTGCGGAG
RIGHT PRIMER	714	20	58.95	50.00	0.00	0.00	0.00	TTGCACTTCTCCGAGGTCTT

SEQUENCE SIZE: 728

INCLUDED REGION SIZE: 728

PRODUCT SIZE: 489, PAIR ANY_TH COMPL: 5.54, PAIR 3'_TH COMPL: 5.54

```

1 GCGATGCAAGACATAATCCATCTATTGAATGCTAAGAACCACGAACCACCAAGATGACC

61 ATCCAGTAGAAAAAATAAGGAAAAAAGAAAGACACGATGTCCGCGAGTTGCTAGTAGACG

121 ATCATTAACGAGATTGTACCAAGATAACAGAGGAAGCTGAAGGAGGTTGGTATCTAACTA

181 GGCTGACGATGCGCAGAGGCACTGAAGGAACATGGATAGATGTTACACGAATTGGTACTG
    >>>>>>>>>>>>>>>>

241 CGGAGTGATTGGGAACGAGAAGCTGCATCTAGAGTAGCTCTAATTGCGATGCAATGAAGC
    >>>>>

301 CTGACGGGAACGTGATGAAGGAGTGAACGCTGTGGAAGAGAGAGCATCGTTATAGAGGAT

361 GCGGAATTACTCGGCTTCTCAAGCGATGGATACTTTTTACAGTAGAAGAGAAATCAAACC

421 GAATCTGTAATCAGACTTCGCCGACCCAACTATACGCACTATGCCACTAGAATAATCTA

481 GATTGGGGAGAGGCCTCCGGGAAGTAGTAGTTATACTGAATGCTCCAGCGGGTGAATG

541 TGAGGGCACAACGAGGCTGCGGCGTTGATGGCGGTGCTGGTCTAGGAATGTTCTGTGT

601 GAGCGTCAGTTCTCCATTGCCATTCCAGGGGTCGTTGACAACGCTAGACGCGGGGGC

661 GGCAGTGTCTCGCCATCATGGACCTGCCAAGAAGACCTCGGAGAAGTGCAAGCAGCG
    <<<<<<<<<<<<<<<<<<<<<<

721 ACCGCGCG
  
```

KEYS (in order of precedence):
 >>>>> left primer
 <<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seq
1 LEFT PRIMER	33	20	58.87	50.00	0.00	0.00	0.00	TAAGAACCACGAACCACCA
RIGHT PRIMER	460	20	58.72	55.00	0.00	0.00	0.00	GTGCGTATAGTTTGGGTCGG
PRODUCT SIZE: 428, PAIR ANY_TH COMPL: 3.53, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	41	20	58.84	55.00	0.00	0.00	0.00	CACGAACCACCAAGATGACC
RIGHT PRIMER	454	20	59.39	50.00	12.92	0.25	0.00	ATAGTTTGGGTCGGCGAAGT
PRODUCT SIZE: 414, PAIR ANY_TH COMPL: 3.53, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	30	20	59.24	50.00	0.00	0.00	0.00	TGCTAAGAACCACGAACCA
RIGHT PRIMER	447	20	59.54	55.00	12.92	0.00	0.00	GGGTCGGCGAAGTCTGATTA

PRODUCT SIZE: 418, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 241 20 59.47 55.00 0.00 0.00 0.00 CGGAGTGATTGGGAACGAGA
RIGHT PRIMER 707 20 59.39 55.00 0.00 0.00 0.00 TCTCCGAGGTCTTCTTTGGC
PRODUCT SIZE: 467, PAIR ANY_TH COMPL: 2.78, PAIR 3'_TH COMPL: 7.55

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high			
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1903	0	0	0	0	110	0	909	266	0	0	37	19	0	562
Right	1843	0	0	0	0	223	0	541	555	0	0	9	34	0	481

Pair Stats:

considered 393, unacceptable product size 386, primer in pair overlaps a primer in a better pair 110, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

RIGHT PRIMER 546 20 58.78 55.00 10.96 3.39 0.00 CGGAGTATGGCCAATCGTTC
PRODUCT SIZE: 470, PAIR ANY_TH COMPL: 2.05, PAIR 3'_TH COMPL: 2.20

4 LEFT PRIMER 369 20 59.02 55.00 0.00 0.00 0.00 ACTCTGTCCAAGCTTCCCTC
RIGHT PRIMER 776 20 59.49 55.00 0.00 0.00 0.00 CTTCAGTTCCTTCACGCTGC
PRODUCT SIZE: 408, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	high
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	end
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2182	0	0	0	0	160	0	912	302	1	0	9	19	0	779
Right	2040	0	0	0	0	230	0	638	437	0	0	5	58	0	672

Pair Stats:

considered 133, unacceptable product size 124, primer in pair overlaps a primer in a better pair 89, ok 9
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      292  20  58.91  55.00  0.00  0.00  0.00  GATGTCACGGTTTGGATGGG
  RIGHT PRIMER     719  20  59.10  55.00  0.00  0.00  0.00  GGGAAAGAAAGCGTAGGAGGT
  PRODUCT SIZE: 428, PAIR ANY_TH COMPL: 0.66, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      295  20  58.83  55.00  0.00  0.00  0.00  GTCACGGTTTGGATGGGAAG
  RIGHT PRIMER     773  20  58.81  50.00  20.06  0.00  0.00  ACCATCTGAGATGTCGTGCT
  PRODUCT SIZE: 479, PAIR ANY_TH COMPL: 14.42, PAIR 3'_TH COMPL: 7.18

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	X	stab
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			
Left	2542	0	0	0	0	25	0	963	543	0	0	25	19	0	967
Right	2587	0	0	0	0	85	0	844	631	0	0	9	10	0	1008

Pair Stats:

considered 478, unacceptable product size 472, primer in pair overlaps a primer in a better pair 146, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB4097.b1

Template masking not selected

No mispriming library specified

Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seg
LEFT PRIMER	255	20	59.05	55.00	8.23	0.00	0.00	TGTATCTCCAGACCGCGATC
RIGHT PRIMER	728	20	59.03	55.00	0.00	0.00	0.00	ATACCATAGGCGGTAGGGC

SEQUENCE SIZE: 783
INCLUDED REGION SIZE: 783

PRODUCT SIZE: 474, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

1 GCGAAAGCCTCAACATCTTTCCCTCAACGAAAGACGTCATACGAAGCCGTGCAAATTCTT

61 TCAGAAGAACACCTGCTCTTTTCGGCAGATCAGTGCCAATTCGCGCACGTGAGAGAAAA

121 CGCGACGACAAAGACAATTGAAGCACCGACGCAGGTTACAATTACCATCTTACTGGTGA

181 CTTTGGCGAGCGAGATCGCTGCTGTTATCAACACACTCGCCCCAGCTTGAACAGAGAGC

241 GACCAAGCCAGACATGTATCTCCAGACCGGATCGGCTCCCGCTTAAACAGTGTGATCC
>>>>>>>>>>>>>>>>>>>

301 AGGGGAGCTTACACCATATCCACACCCCATCCATCCTCACACCCCGCTTCCCGACGCCA

361 CACCCATTTCTGCCACCCACATATGTCTATGCCCCCTACATCCTACCTCAGGCGCAAGC

421 GCCATCGCACGCATCCGTCTCAGCCTCTCGGAGAGATTCTCTCCTAGATAGCGAAATCGA

481 CCTCGACCTGACATCCCCAGTCTCGGCAGCGCTTCTTCTCCTTCTGCAGAGTCCAGCTC

541 CCTTACTGATGGCGATGCCGATTTACTCAACACGCCACTCGACGAGATGCATGTGTATCC

601 TGGATCACGACAGCTCGTGGTCCGCCAAGATATGTGTGGGGTCCCGTGGTGCCTAA

661 TGGAACGTTCTTCGATCCAGCGTCCCCTGGGATATATGGGACGTACATGCCCTACACGCC
<<<<<<<<<<<<<

721 TATGGTATACGGTGGCTTTTACGGACCATGTCTGCAGTTCCTGGGATTGGACCCCGCAC
<<<<<<<<

781 ATT

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seg
1 LEFT PRIMER	118	20	59.00	45.00	15.93	0.00	0.00	AAACGCGACGACAAAGACAA
RIGHT PRIMER	595	20	59.08	55.00	21.15	18.12	0.00	CACATGCATCTCGTCGAGTG
PRODUCT SIZE: 478, PAIR ANY_TH COMPL: 16.17, PAIR 3'_TH COMPL: 1.87								
2 LEFT PRIMER	314	20	58.85	55.00	0.00	0.00	0.00	CCATATCCACACCCCATCCA
RIGHT PRIMER	735	20	59.04	55.00	0.00	0.00	0.00	CCACCGTATACCATAGGCGT
PRODUCT SIZE: 422, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

```

3 LEFT PRIMER      112  20  58.87  50.00  15.93  0.00  0.00  GAGAGAAAACGCGACGACAA
  RIGHT PRIMER     575  20  59.21  50.00  0.00  0.00  0.00  GCGTGTTGAGTAAATCGGCA
  PRODUCT SIZE: 464, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      204  20  58.92  55.00  0.00  0.00  0.00  GTTATCAACACACTCGCCCC
  RIGHT PRIMER     639  20  58.70  55.00  0.00  0.00  0.00  CACACATATCTTGGCGGACC
  PRODUCT SIZE: 436, PAIR ANY_TH COMPL: 1.65, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	
Left	2269	0	0	0	0	108	0	603	639	0	0	11	10	0	898
Right	2208	0	0	0	0	78	0	479	764	0	0	20	29	0	838

Pair Stats:

considered 198, unacceptable product size 191, primer in pair overlaps a primer in a better pair 108, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPB4930.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	111	20	59.03	55.00	0.73	0.00	0.00	GTATACAGCAGCCCGGATCT
RIGHT PRIMER	606	20	59.14	50.00	11.47	0.00	0.00	GAACCGAAGTAGCGCACAAA

SEQUENCE SIZE: 795
INCLUDED REGION SIZE: 795

PRODUCT SIZE: 496, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 ACATACAATATTTTGACGGGCAATACGTCTCTATGGCACTTCTTACGACTGCGGGTTTC

61 GCTGGATGAACCCAGTCCCGACTTCCAAAGACAATTTCTGTGGAATCAAAGTATACAGCA
    >>>>>>>>>

121 GCCCGGATCTGGTGTGTCAGGGACTTATGAAGGCTATGCGTACGATAAGGAAAAGTACCTA
    >>>>>>>>>

181 ACCTAGGCTTTCTTCTCTAAAGTCGAGTACCGAAACGCGACATCGACATAATACTTGTCT

241 TCAACGACATTGCCATAACAGCCGAGACGAACCTTGCCATATTCACCTCGAATTCATCTA

301 CTGGACCTTTTCGAGTTTGCCAGTTATGGCTATACAATAGCAAAAACAATCGGTGATTTTCG

361 CTGTTCAACAAGATGAAAATTCACCGTCTGGATAGCGTACTCGCCGGGCATCTTTGGCA

421 ACGCCACGCTTGAGAAGCTGACAGACGACTGGCTCAACGGAACAGGCATCGCGACAGTCC

481 TTCCTGTCTCGTTGATTGAAGCACACGGTCTCACCATCGTCGATGATGTGTGGTATTGGA

541 TGGTAAGCTCTCGAGCACCCTCACGAAAGCCTATCAGAGTGCTTTTGTGCGCTAGTT
    <<<<<<<<<<<<<<

601 CGGTTTCGCTGTGCGGCTATGCAACTCAACCGACACCTCCTTCGTGACAGCAAGCACACCC
    <<<<<<

661 TTTGGTCCGTGGAGCAAGCGACACTATATCTCGGAAGATAGCTGTGGCGGACAGTCCAGT

721 TTCCTCACGCAGATACCTAATCCGGCGGGTGGGCACATATCGTATACATTTCCGACTTGT

781 GGTTTGCTATAAGCA
```

KEYS (in order of precedence):
>>>>> left primer
<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	108	20	58.80	50.00	0.73	0.00	0.00	AAAGTATACAGCAGCCCGGA
RIGHT PRIMER	508	20	59.13	50.00	0.00	0.00	0.00	CCGTGTGCTTCAATCAACGA
PRODUCT SIZE: 401, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 5.12								
2 LEFT PRIMER	303	20	59.12	55.00	0.00	0.00	0.00	GGACCTTTTCGAGTTTGCCAG
RIGHT PRIMER	765	20	59.68	55.00	0.00	0.00	0.00	ATACGATATGTGCCACCCG
PRODUCT SIZE: 463, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

```

3 LEFT PRIMER      256  20  59.04  50.00  0.00  0.00  0.00  TAACAGCCGAGACGAACCTT
  RIGHT PRIMER     664  20  59.97  55.00  0.00  0.00  0.00  CAAAGGGTGTGCTTGCTGTC
  PRODUCT SIZE: 409, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 6.56

4 LEFT PRIMER      244  20  58.91  50.00  0.00  0.00  0.00  ACGACATTGCCATAACAGCC
  RIGHT PRIMER     653  20  59.97  55.00  0.00  0.00  0.00  CTTGCTGTCACGAAGGAGGT
  PRODUCT SIZE: 410, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not		no	tm	tm	high	high	high		high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2315	0	0	0	0	68	0	1193	325	0	0	32	19	0	678
Right	2296	0	0	0	0	15	0	525	939	0	0	20	19	0	778

Pair Stats:

considered 1603, unacceptable product size 1594, primer in pair overlaps a primer in a better pair 278, ok 9
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC993.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	39	20	58.95	50.00	0.00	0.00	0.00	AACGACTTGGAGAGGCTTCA
RIGHT PRIMER	505	20	59.08	55.00	0.00	0.00	0.00	CGGGAAGCGATAACAAGACG

SEQUENCE SIZE: 761
INCLUDED REGION SIZE: 761

PRODUCT SIZE: 467, PAIR ANY_TH COMPL: 23.65, PAIR 3'_TH COMPL: 23.65

```

1 AACAGGCCGATTCTCTACTAGTCTACCCGCTTCAAACGACTTGGAGAGGCTTCA
   >>>>>>>>>>>>>>>>>>>>
61 TCTCGACTCCTATTTTCTTCGATGGATTATCCGATTGTTACTGACGTGCTTCATGGCAG
121 CGTGCGTGCCAAGGTGTCGGCAGCGATTGCCGGCGATACCCTCAACGAAGTCAACAACGA
181 TCCTGTACAACGAAATAAACTGATCGACAATAATAATCTCTCTCTGGTTCGTCATGAC
241 GTCCGGCAGCCAGTCATCAGCTCTCGGAAGCTCATCGTCCGCCCAAACATTCTCAATAC
301 TACCATTGACAACACTCAGCCGGCATAACGGACGACCATTGGTTGAGGCGGAGTTCAGCAACAC
361 GCTCATGGAATCTAACTATACTTCCGTTGCGGTCAAGGTGTCGACCCCTTACGTTGCTGC
421 TTCGGTGAATACTCCGAGAGCTCGAGCTACAAGAGTACTGAGACCGAAAAGACGGTGTA
481 CTCCTCGTCTTGTATCGCTTCCCGCAGGGCCGCTATTGATTTCAATCGACCTTCCGCG
   <<<<<<<<<<<<<<<<<<<<<
541 CTCAGGCAGCATACTGCTCTCAACTGAATTCACATCTGAGATCAATACCGCTCTCGCCAA
601 ATCATCCCTACTTGAGAAGAGGGAAGCCCTCTATAACATATTTAACGAGTATGGTCATGT
661 TTTCCGCAACCAAGTCACGATTGGGTGGGGCACTCTCCGCACATACACAGGAACTTTTT
721 CTAGAAGCGAGAACGAGGACGAAGTGAGCAGATATCAAAGT

```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	220	20	58.82	55.00	0.00	0.00	0.00	CCTCTCTGGTGCATGA
RIGHT PRIMER	712	20	59.18	55.00	0.00	0.00	0.00	TCTGTGTATGTCGGGAGAG
PRODUCT SIZE: 493, PAIR ANY_TH COMPL: 2.38, PAIR 3'_TH COMPL: 2.38								
2 LEFT PRIMER	16	20	59.08	55.00	0.00	0.00	0.00	TCTACTAGTCTACCCGCT
RIGHT PRIMER	435	20	58.71	55.00	0.00	0.00	0.00	GAGTATTCCACCGAAGCAGC
PRODUCT SIZE: 420, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	251	20	59.18	55.00	0.00	0.00	0.00	CCAGTCATCAGCTCTCGGAA
RIGHT PRIMER	671	20	59.33	50.00	0.00	0.00	0.00	GGTTGCGGAAAACATGACCA

PRODUCT SIZE: 421, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 52 20 58.60 55.00 0.00 0.00 0.00 GGCTTCAGATCTCGACTCCT
RIGHT PRIMER 524 20 58.61 50.00 0.00 0.00 0.00 TGAAATCAATACGGCCCTGC
PRODUCT SIZE: 473, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high			
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2103	0	0	0	0	107	0	675	669	0	0	20	19	0	613
Right	2094	0	0	0	0	74	0	751	486	2	0	21	19	0	741

Pair Stats:

considered 506, unacceptable product size 500, primer in pair overlaps a primer in a better pair 211, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC1098.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seq
LEFT PRIMER	97	20	58.74	55.00	5.84	0.00	0.00	CACGAGACTAGCAGCGAAAG
RIGHT PRIMER	510	20	59.07	50.00	0.00	0.00	0.00	TGGGTTCAACAGGGGAAGTT

SEQUENCE SIZE: 825
INCLUDED REGION SIZE: 825

PRODUCT SIZE: 414, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 ACATCGACCATGAGCACACAGGCCTCAACATCGTCGGGCAGCATGGACGAACGCAGGCTC

61 AATGCTCTCAAGGCATATCGGGATAAAATGCGTGCACACGAGACTAGCAGCGAAAGCCTA
   >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

121 AAGAACCTCCGTTTCTCGCTCAAAGATCTCGAAAAATCCTTTGAGAAGACGGAAGACGAC

181 ATCAAGGCAGTACAGTCCGTGGGGCAGATCATCGCGAAGTCATGAAGCAGCTGGACGAC

241 GAGCGATTCATCGTAAAGCATCCTCAGGACCGCGCTATGTTGTATCCTATCGACCCGCT

301 CTCCCGCCGCGAAACTTAAACCCAACACACGCGTCAGCCTCGACATGACCACCTGACC

361 ATCATGCGCATCTCCACGAGAAGTCGACCCATCGGTGTACAAGATGGCCTTGGAGGAC

421 CCAGGAGGAGCGACCTTTGCTGGCATCGGTGGACTGCAAGAGCAAGTGCAGAACTGCGA

481 GAGGTCATCGAACTTCCCCTGTTGAACCCAGAACTTCTTTCGCGGTGCGGATCAAGCCT
   <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

541 CCAAAGGGCGTTTTGCTCTACGGCCCGCCAGGGACGGGCAAGACCCTGCTGGCGCGCGC

601 GTGGCCGCGACGATGAAGACGAATTTCTCAAGGTGCTCTCCTCGGCGATCGTCGACAGT

661 ACATCGCGAGTCCGCGCGGTGATCCGCGAGATGTTCCGGTACGCGCGGAGCACGAGC

721 CCTGCGTCATCTTCATGGACGAAATCGACGCTATCGGCGGGCGGCGCTTCTCCGAGGGCA

781 CGAGCGCGGATCGTGAGATCCAGCGACGCTGATGGAGCTGCTGAC
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seq
1 LEFT PRIMER	181	20	58.73	50.00	0.00	0.00	0.00	ATCAAGGCAGTACAGTCCGT
RIGHT PRIMER	625	20	59.09	50.00	0.00	0.00	0.00	AATTCGTCTTCATCGTCGCG
PRODUCT SIZE: 445, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	78	20	59.27	50.00	6.82	6.82	0.00	TCGGGATAAAATGCGTGCAC
RIGHT PRIMER	501	20	59.09	55.00	0.00	0.00	0.00	CAGGGGAAGTTCGATGACCT
PRODUCT SIZE: 424, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

```

3 LEFT PRIMER      269  20  58.86  55.00  5.56  0.00  0.00  GACCGCGCTATGTTGTATCC
  RIGHT PRIMER     740  20  58.71  55.00  0.00  0.00  0.00  GTCCATGAAGATGACGCAGG
  PRODUCT SIZE: 472, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      64   20  59.32  55.00  0.00  0.00  0.00  GCTCTCAAGGCATATCGGGA
  RIGHT PRIMER     488  20  59.55  55.00  0.00  0.00  0.00  ATGACCTCTCGCAGTTCTCG
  PRODUCT SIZE: 425, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2478	0	0	0	0	74	0	434	949	0	0	9	19	0	993
Right	2556	0	0	0	0	617	0	254	972	0	0	20	0	0	693

Pair Stats:

considered 1767, unacceptable product size 1759, primer in pair overlaps a primer in a better pair 276, ok 8
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC1268.b1

Template masking not selected

No mispriming library specified

Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seq
LEFT PRIMER	171	19	59.09	57.89	0.00	0.00	0.00	GGATTACAACCTCCCGCCT
RIGHT PRIMER	655	20	58.91	50.00	0.00	0.00	0.00	TGTTATGCAGGAAGAAGCGC

SEQUENCE SIZE: 692

INCLUDED REGION SIZE: 692

PRODUCT SIZE: 485, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1  GCGGGTACGGCAGCTCTTTCGCTTTCGGTCTTGAATAACATTGTTGGCTTTGTTTG  
61  CATTGTCCTCCTGATCCCATACTACGCTTGGCGCAAACCCATCATGCTCACCATAAA  
121 GCAACCGGCTGGATCGAGCGTGACGAGAACTACATCCCTCACTATCGCAAGGATTACAAC  
>>>>>>>>  
181 CTCCCGCTCGGAGAAGGCCAAGAAAGCCGATTATGCTGAAGTCTTCGAAGAGACCCCC  
>>>>>>>>  
241 ATCTGGACGCTCGGGCGAGTGCTGATCATGCAGGGCTGGGATGGTGGCTCTACTTGTCT  
301 CAGAACACTCTGGGCTCTAAGATGTATCCTCCTGGCACGAACCACTTCGACCCGAACTCC  
361 CCACTGTTCAAGCCCAATCAACGCAACTCCATCATCATGTCGGATATCGGTATCACTGCT  
421 ATGGGCGCTGTCTCTTATGTTGCGGCCACGTTGGGTGGATGGCAATTGCCAAGTAC  
481 TATTTTCATCCCTACATGCTGACGAACCATTGGATTGTGATGTTTACCTATCTTACCAC  
541 TCTGATCCAACGATCCCTCATTACTTCGGCAACGAATGGACTTTCTGCGCGGAGCTGCG  
601 TCAACCGTTGACCGACCCCTCATGGGCTGGATGGGGCGTTCTCCTGCATAACATTTGC  
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  
661 CATGACCATGTCGCGCACCACCTCTTCGTTGG
```

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seq
1 LEFT PRIMER	138	20	58.45	55.00	10.10	0.00	0.00	GCGTGACGAGAACTACATCC
RIGHT PRIMER	553	20	58.37	50.00	0.00	0.00	0.00	TCGTTGGATCAGAGTGGTGA
PRODUCT SIZE: 416, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	97	20	58.45	50.00	0.00	0.00	0.00	CAAACCCATCATGCTCACCA
RIGHT PRIMER	570	20	58.22	55.00	0.00	0.00	0.00	GCCGAAGTAATGAGGGATCG
PRODUCT SIZE: 474, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	279	20	59.09	55.00	0.00	0.00	0.00	GGGATGGTGGCTCTACTTGT
RIGHT PRIMER	692	19	59.43	57.89	0.00	0.00	0.00	CCAACGAAGAAGTGGTGCG
PRODUCT SIZE: 414, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

```

4 LEFT PRIMER      48  20  57.41  40.00  0.00  0.00  0.00  TGGCTTTGTTTTGCATTCGT
RIGHT PRIMER      449  20  59.08  55.00  8.75  0.00  0.00  CGCGCAACATAAGAGAGGAC
PRODUCT SIZE: 402, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	stab	ok
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1686	0	0	0	0	104	0	521	497	0	0	25	16	0	523
Right	1758	0	0	0	0	60	0	631	546	0	0	17	0	0	504

Pair Stats:

considered 429, unacceptable product size 424, primer in pair overlaps a primer in a better pair 82, ok 5
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC1479.b1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3' th	hairpin	seq
LEFT PRIMER	249	20	58.80	55.00	0.00	0.00	0.00	TCTAGTTGACTGGGATGGCC
RIGHT PRIMER	676	20	58.64	50.00	0.00	0.00	0.00	GCAGAAAACAGTCGCCGATA

SEQUENCE SIZE: 764
 INCLUDED REGION SIZE: 764

PRODUCT SIZE: 428, PAIR ANY_TH COMPL: 2.04, PAIR 3'_TH COMPL: 0.00

```

1 CTGTCCGCCCGTTCTGACTCATAGCTATCGAAAATAAGCACATTCTACTCGCTTCAGGTTG

61 ATGTACAGACTCTGCCAGACACTAAGGCTACAAGTCCAGCTGTTGCGGTGCGTCCGTG

121 CCGCTAACGCCAGCCGCGACTCTCACAGGCGACAAGCCTGTCGAGAAAGAGGACGTCGAG

181 GCGGAGGCCAAAGACCGCCCGCTCTGTGCGAGCACAGCCATGCTGACGATGGACGC

241 GCCATCCATCTAGTTGACTGGGATGGCCCAACGATCCTGAAAATCCGAAAACCTGGAAA
    >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

301 TACAGCAAGAAAATGGCATCTCATCTTACCGTGTGTCATGCTTCACCTTCATATCCCCATC

361 TCGTCTCCATTATCGCACCTGCCTCAGAGCAGGTCGCTGCCGATTTTGGCGTCACCAGC

421 TCCGTGTCATTGCCATGATGACGTCTGTATTCGTCTCGCGTATGCCTTCGGCCCCCTC

481 ATGTTGCGCCCGCTGAGCGAGATCTACGGCCGCTCGCGCTCCTGCAGCTCGCCAATCTC

541 ATCTATTTTTCGTTAACTCGCGTGGGCTTCGCCAGAAACAAGGCCAGCTCATCGCG

601 TTCCGGTTCCTCGCCGGCCTAGGTGGTCCGCCCGCTCTCGGTCGGCGGGGCGTTATC
    <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

661 GCGGACTGTTTTCTGCCGGAGCAGCGCGGACAGGCGCTCGCGATCTACTCGCTCGGCCG
    <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

721 ATGCTGGGACCGTTGTGGGACCTGTGATCGGCGCGTGGATTGC
    
```

KEYS (in order of precedence):
 >>>>> left primer
 <<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3' th	hairpin	seq
1 LEFT PRIMER	155	20	59.11	55.00	0.00	0.00	0.00	AGCCTGTCGAGAAAGAGGAC
RIGHT PRIMER	596	20	58.46	50.00	3.32	0.00	0.00	ATGAGCTGGCCTTTGTTCTG
PRODUCT SIZE: 442, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	327	20	59.03	50.00	8.92	0.64	0.00	TACCGTGTGTCATGCTTCACCT
RIGHT PRIMER	752	19	59.32	57.89	0.00	0.00	0.00	CCGATCACAGGTCCCACAA
PRODUCT SIZE: 426, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	239	20	58.78	55.00	0.00	0.00	0.00	GCGCCATCCATCTAGTTGAC
RIGHT PRIMER	681	19	58.85	57.89	0.00	0.00	0.00	CTCCGGCAGAAAACAGTCG

PRODUCT SIZE: 443, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 7 20 59.33 55.00 0.00 0.00 0.00 GCCCGTTTCGACTCATAGCTA
RIGHT PRIMER 449 20 57.59 45.00 19.50 0.00 0.00 ACAGACGTCATCATGGCAAT
PRODUCT SIZE: 443, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2030	0	0	0	0	260	0	557	624	0	0	16	38	0	535
Right	2127	0	0	0	0	643	0	171	921	0	1	28	21	0	342

Pair Stats:

considered 227, unacceptable product size 222, primer in pair overlaps a primer in a better pair 192, ok 5
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

RIGHT PRIMER 826 20 59.13 50.00 0.00 0.00 0.00 AAAGCCGTTGTCTAAGCGTG
PRODUCT SIZE: 468, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

3 LEFT PRIMER 319 20 58.93 50.00 0.00 0.00 0.00 GCTCGTTAAGAAGCTCGCAA
RIGHT PRIMER 765 20 59.24 55.00 0.00 0.00 0.00 CCTCCACTCCAGAACCACAA
PRODUCT SIZE: 447, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 182 20 58.82 55.00 0.00 0.00 0.00 GTCAAGCTTCCAATGTCCC
RIGHT PRIMER 634 20 59.34 50.00 0.00 0.00 0.00 CGACTTGACGTTTTGCCAGT
PRODUCT SIZE: 453, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 4.73

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	ok
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2423	0	0	0	0	193	0	553	773	0	0	53	71	0	780
Right	2639	0	0	0	0	106	0	585	997	0	0	16	16	0	919

Pair Stats:

considered 1448, unacceptable product size 1441, primer in pair overlaps a primer in a better pair 246, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC1633.b1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	14	20	58.93	55.00	0.00	0.00	0.00	CGTAAGTTGAAGGGCGTGAG
RIGHT PRIMER	498	20	58.97	55.00	0.00	0.00	0.00	TGCTCTATCCGTGCCTAGTG

SEQUENCE SIZE: 673
 INCLUDED REGION SIZE: 673

PRODUCT SIZE: 485, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

1 CGCAGCGACGATGCGTAAAGTTGAAGGGCGTGAGCTCACATGGTGCCGGTGCAGCTGAAGC
    >>>>>>>>>>>>>>>>>>>
61 GCCTGGTCCTATGGGAATGCGCGGGTGCGAAGATGTGAGCCGCGGGAGACACAGATGG
121 AAGGGGCGGAGACTTCTGCTAGACTGCTTCCGAATGCCTATTTTCCCCGTTTCGCTGG
181 TACAAAAGCTGTTTGTGTCTCATTTTCATTTTCTTTTCCGTTCCCGCCTCGCTACTTC
241 GTCCAGCCGTTTCGCATCTCGCTGCTCCATCCTCGTCGTTTTTCATTCTCCGCATCTACCA
301 AGTCTACGTCCATCTTGATGTTTTTCTGTCTGCTCCCTACTCCATGTCCCTCGCTCCGGTT
361 CCTTCCGCCATATACTCCAGAATCCCCTCCACAGTCCGCACGTCTGTGCACCACAGCTC
421 AGGATCTAGGCTCACGCATACCGATTGCCCCGTTCTAACGCACCGTGCACCTCTCGCA
    <<
481 CTAGGCACGGATAGAGCACACCCGAGGCTGCATACCCACCGTCCCATCTCAGCCAAGC
    <<<<<<<<<<<<<<<<<<<
541 AATCAGCCAACCATATACACCGTAACACATATCTCTTACATACGTATATCTGGCTTGATC
601 GTTCTCATGTCGCATGTCCTGTCATGACCGTTCGCATATTTCTATATATATGTGTTT
661 CTTTCTTCCCGAC
    
```

KEYS (in order of precedence):
 >>>>> left primer
 <<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	107	20	59.46	60.00	0.00	0.00	0.00	GGAGACACAGATGGAAGGGG
RIGHT PRIMER	545	20	58.91	50.00	0.00	0.00	0.00	TGATTGCTTGCCGTGAGATG
PRODUCT SIZE:	439,							PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00
2 LEFT PRIMER	135	20	58.45	50.00	0.00	0.00	0.00	TCTGCTAGACTGCTTTCCGA
RIGHT PRIMER	622	20	59.10	50.00	21.37	0.00	0.00	AGGGACATGCGACATGAGAA
PRODUCT SIZE:	488,							PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00
3 LEFT PRIMER	141	20	59.67	50.00	14.54	4.15	0.00	AGACTGCTTTCCGAATGCCT
RIGHT PRIMER	627	20	59.46	50.00	0.00	0.00	0.00	ATGACAGGGACATGCGACAT
PRODUCT SIZE:	487,							PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00
4 LEFT PRIMER	54	19	59.17	57.89	2.29	0.00	0.00	CTGAAGCGCCTGGTCCTAT

RIGHT PRIMER 458 20 58.90 50.00 4.35 0.00 0.00 TTAGAACGGGCGAATCGGTA
PRODUCT SIZE: 405, PAIR ANY_TH COMPL: 20.67, PAIR 3'_TH COMPL: 1.95

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1572	0	0	0	0	72	0	248	806	0	0	71	19	0	356
Right	1644	0	0	0	0	168	0	403	612	0	0	3	0	0	458

Pair Stats:

considered 572, unacceptable product size 565, primer in pair overlaps a primer in a better pair 232, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      4  20  59.18  55.00  0.00  0.00  0.00  ATCACTCCTCGCTTCCAGAC
RIGHT PRIMER      431  20  59.10  55.00  0.00  0.00  0.00  ACGGTTGGGGTGTAGATGAG
PRODUCT SIZE: 428, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      1  20  59.18  55.00  0.00  0.00  0.00  CTCATCACTCCTCGCTTCCA
RIGHT PRIMER      473  20  58.89  55.00  0.00  0.00  0.00  GGCCTACGGAAGATGTGAGA
PRODUCT SIZE: 473, PAIR ANY_TH COMPL: 3.93, PAIR 3'_TH COMPL: 7.05

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	end	ok	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	stab	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	ok	
Left	2060	0	0	0	0	282	0	425	675	0	0	4	22	0	652
Right	2062	0	0	0	0	183	0	687	566	0	0	4	19	0	603

Pair Stats:

considered 86, unacceptable product size 80, primer in pair overlaps a primer in a better pair 72, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 433, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 172 20 58.96 50.00 0.00 0.00 0.00 AAGTGACAGCTTCTCGACCA
RIGHT PRIMER 601 20 58.58 50.00 0.00 0.00 0.00 TGGTGGTAGAGAACTGTGCA
PRODUCT SIZE: 430, PAIR ANY_TH COMPL: 24.18, PAIR 3'_TH COMPL: 24.18

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	ok	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1776	0	0	0	0	46	0	386	719	0	0	2	0	0	623
Right	1776	0	0	0	0	31	0	348	684	0	0	4	0	0	709

Pair Stats:

considered 25, unacceptable product size 19, primer in pair overlaps a primer in a better pair 34, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)


```

3 LEFT PRIMER      228  20  58.90  50.00  0.00  0.00  0.00 CGCCCTCATGCTGAATCAAA
  RIGHT PRIMER     700  20  58.08  50.00  0.00  0.00  0.00 AGCTCGGTAGTTACAGGTGT
  PRODUCT SIZE: 473, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      167  20  59.10  55.00  0.00  0.00  0.00 CGCCTACCTCCTCAAAGACA
  RIGHT PRIMER     662  21  58.86  47.62  0.00  0.00  0.00 TGTC AACACAATACGAGCCAC
  PRODUCT SIZE: 496, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2225	0	0	0	0	146	0	478	731	0	0	114	33	0	723
Right	2257	0	0	0	0	130	0	684	625	3	1	45	18	0	751

Pair Stats:

considered 1114, unacceptable product size 1106, primer in pair overlaps a primer in a better pair 291, ok 8
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

RIGHT PRIMER 624 20 58.90 50.00 11.37 0.00 0.00 GCATGCTCATCCGAAAAC
PRODUCT SIZE: 438, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 79 20 58.98 55.00 0.00 0.00 0.00 CTGCACAATCATCCTCTGCC
RIGHT PRIMER 578 20 58.62 55.00 0.00 0.00 0.00 CGTACTCTGCGGAACCTCTA
PRODUCT SIZE: 500, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	poly	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	X	stab	ok
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			
Left	2120	0	0	0	0	59	0	860	370	0	0	4	38	0	789
Right	2128	0	0	0	0	305	0	460	631	0	0	25	36	0	671

Pair Stats:

considered 151, unacceptable product size 145, primer in pair overlaps a primer in a better pair 24, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC2679.g1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions

OLIGO start len tm gc% any_th 3'_th hairpin seq
 LEFT PRIMER 72 20 59.18 55.00 0.00 0.00 0.00 AGGCTGCTAGGTAGTGAACG
 RIGHT PRIMER 526 20 59.13 55.00 0.00 0.00 0.00 GTTCAGCCTTGTCTTGACGG
 SEQUENCE SIZE: 779
 INCLUDED REGION SIZE: 779

PRODUCT SIZE: 455, PAIR ANY_TH COMPL: 2.99, PAIR 3'_TH COMPL: 9.55

```

1 GACATGATGAATAGTGATGCCATTGATGAGCGATGGCCGTCGCGAGCGCATTTCATAAGT

61 GGTAGGCTGCTAGGCTGCTAGGTAGTGAACGCGTAGAACGGCACATGTTATGTCCGATAA
  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

121 ACGAAACAAAACGGACCCAATCACCACCATGCCCGTCGCGGAGGGACAGGCCAGACAGCA

181 GCGTTCAACTTTTACCACGAATAAAAGAGACCCTCGAAACTAATAAATAAATAGATAAA

241 CAAACGAGCGCGTGGGTGGGGCGGTCGGGTCAAACAAGGTATGCGAGTGGAATGCTAG

301 GAAACGTGGGGATATAGTTGTTTCGATCGAGTGTGCGCCACGGTTCAAAAATGTCGAACA

361 GATACAGTGAAAAAATTATACGTGTTATAACCATTACGCCTCGTCAAACCTTGTCGCGTC

421 GTGCCATTGGTTACACAATATGGAACACATAACCAACCCTAGATCGCGCGAGCGATCTAG

481 AAGACGACTATGCACGGTCTACCACGCCGTCAGACAAGGCTGAACAGGATAGTCGAAAA
  <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

541 CGCAAGCGCGATAGACGGCCAGTCGCCGCCGGGCTCACGTGCGTCTGGTCACTGCT

601 CCCGGTCGTAGAGTTGCTGGTGCTGTTCTGTCGTGGCCGATGATGTCGACGGCTTGGAACT

661 GCTCGAGGCCGACTTCGATGAGCTGGAGGCGGTACTCGACGGAGTGGAGCTGGCGTTGGC

721 GCTGGCAGAAGACGAAGGGGCAGCCGAGGAGCCGCTCGCCGCGTTGTTGTTCTGGACAT
  
```

KEYS (in order of precedence):

```
>>>>> left primer
<<<<<< right primer
```

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	14	20	58.70	50.00	0.00	0.00	0.00	GTGATGCCATTGATGAGCGA
RIGHT PRIMER	498	20	58.83	50.00	0.00	0.00	0.00	ACCGTGCATAGTCGTCTTCT
PRODUCT SIZE: 485, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	172	20	59.06	50.00	0.00	0.00	0.00	CAGACAGCAGCGTTCAACTT
RIGHT PRIMER	658	20	59.75	50.00	17.16	0.00	0.00	TTCCAAGCCGTCGACATCAT
PRODUCT SIZE: 487, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	68	20	58.60	55.00	0.00	0.00	0.00	TGCTAGGCTGCTAGGTAGTG
RIGHT PRIMER	487	20	59.42	55.00	0.00	0.00	0.00	TCGTCTTCTAGATCGCTCGC
PRODUCT SIZE: 420, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

4 LEFT PRIMER 127 20 58.68 50.00 0.00 0.00 0.00 CAAAACGGACCCAATCACCA
 RIGHT PRIMER 537 20 57.85 50.00 0.00 0.00 0.00 TCGACTATCCTGTTTCAGCCT
 PRODUCT SIZE: 411, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2190	0	0	0	0	439	0	730	451	0	1	32	24	0	513
Right	2280	0	0	0	0	313	0	337	1020	0	0	20	0	0	590

Pair Stats:

considered 3311, unacceptable product size 3305, primer in pair overlaps a primer in a better pair 524, ok 6
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 401, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

3 LEFT PRIMER 226 20 58.97 55.00 0.00 0.00 0.00 AGGAACAGGTCGCTCGATAG
RIGHT PRIMER 664 20 58.68 50.00 0.00 0.00 0.00 GCTTGTTCACCTCCTTGCCCT
PRODUCT SIZE: 439, PAIR ANY_TH COMPL: 1.44, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 8 20 58.83 55.00 0.00 0.00 0.00 TTCCTTACGACTCCTCCACG
RIGHT PRIMER 429 20 58.74 50.00 0.00 0.00 0.00 ACGAGAGCCATGAAGACTGT
PRODUCT SIZE: 422, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	high
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	end
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2267	0	0	0	0	62	0	656	733	0	0	7	20	0	789
Right	2352	0	0	0	0	49	0	627	948	0	0	8	0	0	720

Pair Stats:

considered 133, unacceptable product size 126, primer in pair overlaps a primer in a better pair 43, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC2832.b1

Template masking not selected
 No mispriming library specified
 Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	121	20	58.83	55.00	0.00	0.00	0.00	GTGTGTCCATTTCTTCCCCG
RIGHT PRIMER	579	20	59.11	55.00	0.00	0.00	0.00	GTTCTACCCACTGTCGCTCT

SEQUENCE SIZE: 772
 INCLUDED REGION SIZE: 772

PRODUCT SIZE: 459, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

1 ACGACGATGACGACTCCTCCGAATCGGGCTCGGACCTCGGACAGACGTCTGACGATGCGC

61 TTGAGCTACTCGCCGCGTGTCCCCGAGACGCGGTGAATGCCCTGCCACGCCAAGC

121 GTGTGTCCATTTCTTCCCCGGCATTGGCGCATCTTCGATGGGGTCTGACTCACGCTGC
   >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

181 CGGGCAAGCCACGAACCCTGTACGTCGACGGGAAGAGCGCCGAGATCGTCAGCTTGCGTG

241 AGAGTATCGTCGCCCTCTTGACTTGGCGGATGAACATCTCGAGTGCAATGCGCTCGTCA

301 TTGCGCTCGAAAAAACTACCCCGCGCTGGGCGACCTCTTGCACTCGCTCATGTATGTCG

361 GCGGCACCGTCGTTACTAACCTCCGTTCCAGGTCGACTCCGCGTACATCCTCGTCGGTC

421 TGGAGATCTAAGCTGTCTTTGACGAGTGCTGAGCAAGTGACTGACTGTCATCTGATCG

481 GAATAATAGTGCAGGATGGGCAAGAATCGGATAAGATCATAAGTGGGCAGCTGAACGAGC

541 GTGAGGTATCACTGCTACGAGAGCGACAGTGGGTAGAACCCGATGAATCAACGGGCGAGT
   <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

601 GCGGGTGCAGGAATGACACGAGGATGTCATGTTGTTAGATAAACTGATGAACATTTGCG

661 GGGCGAAGATGACGGTCATGGATTCTGTCTTAAATTCTTTTTCTCTTCTATGTGTTT

721 CTTTGTTTCATGTTGAGTACACCTGCGTTTCAATACATGTCATGGTCTTTTT
  
```

KEYS (in order of precedence):
 >>>>> left primer
 <<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	257	20	59.20	55.00	0.00	0.00	0.00	CCTTGACTTGGCGGATGAAC
RIGHT PRIMER	663	20	58.82	50.00	0.00	0.00	0.00	CCCCGCAAATGTTTCATCAGT
PRODUCT SIZE: 407, PAIR ANY_TH COMPL: 13.86, PAIR 3'_TH COMPL: 13.86								
2 LEFT PRIMER	115	20	58.76	50.00	0.00	0.00	0.00	CCAAGCGTGTGTCATTTCT
RIGHT PRIMER	551	20	58.83	50.00	0.00	0.00	0.00	TGATACCTCAGCTCGTTCA
PRODUCT SIZE: 437, PAIR ANY_TH COMPL: 14.57, PAIR 3'_TH COMPL: 20.62								
3 LEFT PRIMER	128	20	59.54	55.00	17.73	0.21	0.00	CATTTCTTCCCCGGCATTG
RIGHT PRIMER	625	20	59.10	50.00	0.00	0.00	0.00	ATCCTCGTGTCTTCTGCA

PRODUCT SIZE: 498, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 118 20 58.48 50.00 0.00 0.00 0.00 AGCGTGTGTCCATTTCTTCC
RIGHT PRIMER 537 20 59.27 55.00 9.47 0.00 0.00 CGTTCAGCTGCCCACTTATG
PRODUCT SIZE: 420, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high			
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2130	0	0	0	0	311	0	137	1075	0	0	12	29	0	566
Right	2213	0	0	0	0	169	0	866	441	0	0	6	15	0	716

Pair Stats:

considered 393, unacceptable product size 386, primer in pair overlaps a primer in a better pair 163, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 465, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 4 20 59.51 60.00 0.00 0.00 0.00 TATTAGCCTCCCTCCCTCCC
RIGHT PRIMER 438 20 59.67 60.00 0.41 0.00 0.00 GGAGTCCTTGCCTTCACCC
PRODUCT SIZE: 435, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1853	0	0	0	0	180	0	459	506	0	0	134	41	0	533
Right	2028	0	0	0	0	129	0	180	1002	0	0	37	0	0	680

Pair Stats:

considered 1037, unacceptable product size 1029, primer in pair overlaps a primer in a better pair 95, ok 8
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC2967.g1

Template masking not selected

No mispriming library specified

Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	103	20	58.90	55.00	0.00	0.00	0.00	GTGAGGACATAGCACGAGGA
RIGHT PRIMER	584	20	59.02	50.00	0.00	0.00	0.00	TCGTCCAAAGCTCATCAGGT

SEQUENCE SIZE: 770
INCLUDED REGION SIZE: 770

PRODUCT SIZE: 482, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

1 GGAGAACGACTAAGTGTACATTCGGTGTGGATGCAGGTGCTAGCGAGATACACATGCGG

61 TGGAGTACTAGTCCAATGACAAGCCTATGTGGATTGTGACATGTGAGGACATAGCACGAG
>>

121 GAAACAGGTGGGAGCAATGCAGCGGTAAGAGGGGAGATTCGGGGAGGAAGACAGACAAG
>>

181 GTTAGATAACAATTATAAACAGTGAATGGTATGCAGAGATGCAGACGATGATGAAGGTGGT

241 GTGCGGCGTGGTTCGTTGATCAGGGAAGCGCGTGGTGAACAGTAGATGGGGTAACTGTC

301 AGAGGCCTTCTGGGCATGGCGAGATGGAATTGGCAAGGGTTAGGAAAAGAGACGAGAAA

361 AAAAGTGTGGCACGTAAGATGTCTTGGTATCATCGAATTAGTCTTGTAGTGTGTGAAAA

421 TCATATCATTATGTCGGCTTGAATTCGATGTCGCCAACATGTCGACGCTACCAGCGCGA

481 GACCTGGCAAAGCGTTTTGAAGAGGGAGAGGGAGAATAAAAGTAAAATTGGCATAGATG

541 CTTCTCCGTTCTGGAGTTGTTCATGACCTGATGAGCTTTGGACGAAGACTTTTTAGGCGAG
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

601 ATGGTAGCGGCGCAAGTTTTGTGCGCAACGACGTGCGCTCAACAATCTTGTGTCGACAGAC

661 TTGATGGGCCGACTCCCGATGCACCAGACAGAGCCACTTCGTCGTAAGCTTTGATAC

721 ATCCGCCAGGCGAAACGGTAAGGTCGTAACATTTTGCCTTATACTCGCT

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3' th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	270	20	59.01	55.00	0.00	0.00	0.00	CGCGTGGTGAACAGTAGATG
RIGHT PRIMER	729	20	59.14	55.00	0.00	0.00	0.00	CTGGCGGATGTATCGAAAAG
PRODUCT SIZE: 460, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	40	20	58.94	55.00	0.00	0.00	0.00	GCTAGCGAGATACACATGCG
RIGHT PRIMER	473	20	59.28	55.00	17.16	0.00	0.00	GGTAGCGTCGACATGTTTGG
PRODUCT SIZE: 434, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	158	20	58.80	55.00	0.00	0.00	0.00	ATTCGGGGAGGAAGACAGAC
RIGHT PRIMER	651	20	58.85	50.00	0.00	0.00	0.00	CAAGATTGTTGAGGCGACGT

PRODUCT SIZE: 494, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 120 20 59.11 55.00 0.00 0.00 0.00 GGAAACAGGTGGGAGCAATG
RIGHT PRIMER 610 20 59.61 55.00 0.00 0.00 0.00 CCGCTACCATCTCGCCTAAA
PRODUCT SIZE: 491, PAIR ANY_TH COMPL: 5.98, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high				
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	X	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			stab	ok
Left	2147	0	0	0	0	127	0	730	508	0	0	20	19	0	743	
Right	2110	0	0	0	0	96	0	739	584	0	0	17	32	0	642	

Pair Stats:

considered 154, unacceptable product size 148, primer in pair overlaps a primer in a better pair 102, ok 6
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC2997.g1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	138	20	58.98	55.00	16.62	0.00	0.00	GATAGTACCTGTGACGGCGA
RIGHT PRIMER	600	20	58.92	55.00	0.00	0.00	0.00	GAACCTGACGATGCTCAACC

SEQUENCE SIZE: 746
INCLUDED REGION SIZE: 746

PRODUCT SIZE: 463, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 GCGCGCGAAAATAATACATGTATAGCAAACGTCCAGTACATATGGTGGAAATTAGATGC
61 GCGACGGGAACCCCTGATCACCGATTCCAAGATAGAAGACTCATGTCTCCGAGCCGCCTT
121 GGCTTCAGGAGGTGTCGGATAGTACCTGTGACGCGAGCAGAACGAAGAGACCGGTGCA
    >>>>>>>>>>>>>>>>>>
181 GCCACGTATGCCAGCCGAGGAACGGGTTCTTCCCCCCATCCACGATACCGTGGTGATG
241 ACTATCGACTTCGTTCTGAGTAGGACCGCACTGGGAAGTTCATGGTGACGTTGAGCTGA
301 TACCGGCCCTTGAGCAGTTTGTGCCATCGTTCTGCGTAGAGCTTAGTGAACGTGGGG
361 AGGCCGGCGGTGCGCATCCAATTCTGAAAGTGCTCGTTGGAGCGGAGGTCGGGTGGGGGC
421 TTGTCCGTGCTGTAGCCATCGGGGAACGCGGCGCCCAATTCGGAGCGGAACAATCTCG
481 TCAAGGTTATAGTCGGGGGAGTTCGTATATTTCTTTGCCTCTCCCGCCAGGCGATGCCC
541 TGCTCGCTGAACGATACGAGTCCGTAGCGTTCTCAGAGGGGTTGAGCATCGTCAGGTTT
    <<<<<<<<<<<<<<<<<<<<
601 GAAAACGTGTCGTTGAACATTGAGTTAGCGATCAAGCCGATGGGTAGACGACTTTGTTG
661 TCGAGGATGGCGACAGGCTTGACGTTACCGTTGTAAGATCGCTCGCCGTGCGGTTTTC
721 CCTTAAGCTGGTTCGAGTCGTAACCTCT
```

KEYS (in order of precedence):

>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	122	20	58.89	55.00	0.00	0.00	0.00	GCTTCAGGAGGTGTCGGATA
RIGHT PRIMER	579	20	58.91	55.00	0.00	0.00	0.00	CTCTGAGAACGCTACGGACT
PRODUCT SIZE: 458, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	333	20	58.90	55.00	0.00	0.00	0.00	CCTGCCGTAGAGCTTAGTGA
RIGHT PRIMER	736	20	59.10	55.00	4.29	0.00	0.00	CTCGACCAGCTTAAGGGGAA
PRODUCT SIZE: 404, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.11								
3 LEFT PRIMER	44	20	58.99	50.00	0.00	0.00	0.00	TGGTGGAAATTAGATGCGCG
RIGHT PRIMER	485	20	59.28	55.00	0.00	0.00	0.00	CTTGACGAGATTGTCCGCC

PRODUCT SIZE: 442, PAIR ANY_TH COMPL: 0.09, PAIR 3'_TH COMPL: 3.56

4 LEFT PRIMER 269 20 59.12 55.00 5.01 10.33 0.00 GCACTGGGAAGTTCATGGTG
RIGHT PRIMER 744 20 58.75 50.00 5.20 0.00 0.00 AGTTACGACTCGACCAGCTT
PRODUCT SIZE: 476, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high			
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1992	0	0	0	0	85	0	538	723	0	0	19	21	0	606
Right	1976	0	0	0	0	248	0	400	645	0	0	11	27	0	645

Pair Stats:

considered 232, unacceptable product size 220, primer in pair overlaps a primer in a better pair 64, ok 12
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 471, PAIR ANY_TH COMPL: 4.24, PAIR 3'_TH COMPL: 11.29

4 LEFT PRIMER 204 20 58.84 55.00 5.23 0.00 0.00 CTCCGGAAGCTCAAAGCCAAG
RIGHT PRIMER 667 20 59.62 60.00 0.00 2.38 0.00 GAGACACTCCTCGACGATGG
PRODUCT SIZE: 464, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high				
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	X	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			stab	ok
Left	2090	0	0	0	0	63	0	459	820	0	0	14	17	0	717	
Right	2142	0	0	0	0	168	0	490	788	0	0	16	0	0	680	

Pair Stats:

considered 579, unacceptable product size 571, primer in pair overlaps a primer in a better pair 194, ok 8
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC3106.g1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
LEFT PRIMER	280	20	58.83	55.00	0.00	0.00	0.00	GTAAGGAGCTTGGCACTGG
RIGHT PRIMER	699	20	59.02	55.00	0.00	0.00	0.00	GCTGGAGGGTAGGTTGTTCT

SEQUENCE SIZE: 797
INCLUDED REGION SIZE: 797

PRODUCT SIZE: 420, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
 1 TCCCCGCGATCGCTGTTCCCATCTCTCAAACGAAGGCTCAAGCTCGTGCAGAGGATATC
61 GATGCTCGTGCCTGGGCCTTGGCTCGATCGTCAAGGAACTTGGCCTCGGTGCTCTCAGT
121 GGTGGAGCTCTCTCCGCCCTGAACCACTTCATTGGCGGTGACTCGTCTTCCAGTCGTCGC
181 GATGTCAGCCCTGAGGATCTCGCGGAGCTCATGGAGGCTCTTCAAAGCGAGTCCGGTGAC
241 GGCGACATCGAAGCTCGCAAGCTTTCCCTCGGTACTATCGTAAAGGAGCTTGGCACTGGT
    >>>>>>>>>>>>>>>>>>>
301 GCCGTTACCAGCGGTGCCGTGCGCCCTCACCACTTCCCTGGTAGTGGAAGCGACAGC
361 AAGGCCAACAAAGCGTGCCTCGAGGAGCTTGAAGGCTCGCGCCTAGGGAGCCTTCTGGGC
421 AAATTGATTCCATCTGCTGAGGAGAGCCTTAGCAAGTCTCAAGAACAGCATAGTGGGC
481 GGCCTTGCGTCTGGTGGAGTTGTCGCCGCTGGAAGTGCCGCTTCCGGTAACAACAAGCGC
541 GAATTGTCTGAGCTCGAGGCTCGCGCCAGCATTGGTCCAGCATTGTCCAAGCTGGAGGCG
601 TCTCTCGGCAAAGCGTCTGAGCACTATCGTCCGTAGCCTTGCTGTGCTGGTGTCTCC
661 GTAGGTGCCAAAACCATTAAGAACAACCTACCCTCCAGCCAGACACAGCGTCGCGAGTTC
    <<<<<<<<<<<<<<<<<<<<<<
721 GACGAACCTCGATGCTCGCAGCCTTGGCAGCGCATTGGGCAAGATTCTCCCGCAAGCCACC
781 GACGACATCGTCACTGT
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

	<u>start</u>	<u>len</u>	<u>tm</u>	<u>gc%</u>	<u>any_th</u>	<u>3'_th</u>	<u>hairpin</u>	<u>seq</u>
1 LEFT PRIMER	11	20	58.73	50.00	0.00	0.00	0.00	TCGCTGTTCCCATCTCTCAA
RIGHT PRIMER	471	20	59.12	55.00	0.00	0.00	0.00	GCTGTTCTTGAGGACCTTGC
PRODUCT SIZE: 461, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	80	20	59.39	50.00	15.94	0.00	0.00	TTGGCTCGATCGTCAAGGAA
RIGHT PRIMER	558	20	59.08	55.00	15.40	0.00	0.00	CTCGAGCTCAGACAATTCCG
PRODUCT SIZE: 479, PAIR ANY_TH COMPL: 12.73, PAIR 3'_TH COMPL: 1.12								


```

3 LEFT PRIMER      19  20  58.63  55.00  0.00  0.00  0.00  CCCATCTCTCAAACGAAGGC
  RIGHT PRIMER    481  20  59.27  55.00  0.00  0.00  0.00  CGCCCACTATGCTGTTCTTG
  PRODUCT SIZE: 463, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER     130  20  59.96  55.00  0.00  0.00  0.00  CTCTCCGCCTTGAACCACTT
  RIGHT PRIMER    586  20  59.11  50.00  7.20  1.30  0.00  ACAATGCTGGACCAATGCTG
  PRODUCT SIZE: 457, PAIR ANY_TH COMPL: 0.62, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	end	ok
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	X	stab
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin			
Left	2387	0	0	0	0	238	0	256	1128	0	0	37	6	0	722
Right	2388	0	0	0	0	163	0	321	1193	1	1	16	0	0	693

Pair Stats:

considered 318, unacceptable product size 313, primer in pair overlaps a primer in a better pair 348, ok 5
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC3196.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

```
OLIGO        start  len  tm  gc%  any_th  3'_th  hairpin  seq
LEFT PRIMER    4    20  59.02  55.00  0.00  0.00  0.00  GCACCCTCTTGTACCTT
RIGHT PRIMER  435   20  58.83  55.00  0.00  0.00  0.00  GTTGGGATTCAGGTGGTTCG
SEQUENCE SIZE: 735
INCLUDED REGION SIZE: 735
```

PRODUCT SIZE: 432, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 CCCGCACCCTCTTGTACCTTTTCGCCCGCTTGGCCCTCTGGTCACTGTATGGGTTTC
  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
61 GACAGGCCTTGTGCTACCGGGCTATGGGTCATCGCTCATGAGTGTGGTACCAAGCATT
121 CTCCGAGTCCAAGTTCATCAACAATGTGGTTGGTTGGTCTCCATTCCGGTCTTGGTGT
181 TCCGTACCATTCTTGCGCATCTCTCACGCTAAGCATCACGCTCCACCGGACACATGAC
241 CCAAGACCAGGTGTTTGTACCCAAGACCAGGTCTCAGGTGAAGCTACCTGCATTTGACTC
301 CACAAAAGAAGATATCTGGGGTGAAGCATTTCOAATGAGGCTCATATCTGCTTTTGGT
361 TGGCCCATGTATCTGTTCACGAACGCTTCCGGTCAGAAGCGTTACCCTGCGGGCACGAAC
   <<<<<<
421 CACCTGAATCCCAACTCCGTGATTTTCGGCCCCACCAGTACGGGCAGATTATCATCTCA
   <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
481 GACATCGGAATCCTTTTCTGGATCGGCACCCTGATTGCGTGGAGCTACAAGAGTGGCTTC
541 GCCGAGGTTCTTCGCTATATCTCGTTCCTTACCTATGGGTCAACCACTGGCTCGTTCCT
601 ATCACGTTCTCCAGCACACCGACCCATTCTTCTCACTATCGTGCACCGGAGTTCACG
661 TTCCCCGTGGTGCCTCGCTACGCTTGACCGGAATCTTCTGGGCGACTTAGTTCATTCA
721 TGGGCTGGATAGGCG
```

KEYS (in order of precedence):
>>>>> left primer
<<<<<< right primer

ADDITIONAL OLIGOS

```
        start  len  tm  gc%  any_th  3'_th  hairpin  seq
1 LEFT PRIMER    164  20  58.83  55.00  0.00  0.00  0.00  CATTCCGGTCTTGGTGTTC
  RIGHT PRIMER   640  20  59.09  55.00  0.00  0.00  0.00  AGTGAGGAAGAATGGGGTTCG
  PRODUCT SIZE: 477, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

2 LEFT PRIMER    202  20  58.80  55.00  0.00  0.00  0.00  CTCTCACGCTAAGCATCACG
  RIGHT PRIMER   619  20  58.74  50.00  0.00  0.00  0.00  TGTGCTGGAGGAACGTGATA
  PRODUCT SIZE: 418, PAIR ANY_TH COMPL: 5.53, PAIR 3'_TH COMPL: 8.41
```

```

3 LEFT PRIMER      36  20  59.17  60.00  0.00  0.00  0.00  CCCTCTGGTCACTGTATGGG
RIGHT PRIMER      438  20  59.30  55.00  0.00  0.00  0.00  GGAGTTGGGATTCAGGTGGT
PRODUCT SIZE: 403, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      109  20  59.02  50.00  0.00  0.00  0.00  TCACCAAGCATTCTCCGAGT
RIGHT PRIMER      600  20  59.53  50.00  11.74  0.00  0.00  AAGAACGAGCCAGTGGTTGA
PRODUCT SIZE: 492, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 2.53

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	end	ok	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	ok	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	
Left	2015	0	0	0	0	34	0	546	581	0	0	11	2	0	841
Right	1908	0	0	0	0	96	0	531	594	0	0	9	32	0	646

Pair Stats:

considered 102, unacceptable product size 95, primer in pair overlaps a primer in a better pair 38, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC3360.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	126	20	59.04	50.00	0.00	0.00	0.00	TGAGCACCTTTTCATGGCAC
RIGHT PRIMER	595	20	59.09	55.00	0.00	0.00	0.00	CCTCAGCCTCCTTCATGACA

SEQUENCE SIZE: 795
INCLUDED REGION SIZE: 795

PRODUCT SIZE: 470, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 CAGATGGCCAAATATTTGGAGACAGTGTACGTCTCCGGATGGCAGTCGTCTAGTACCGCG
61 TCGAGCACGAACGAACCGGTCCCGATCTTGCCGATTATCCATAACAACACCGTACCTAAC
121 AAGGTTGAGCACCTTTTCATGGCACAGCTTCCATGACCGCAAACAGCGGAAGCCCGC
    >>>>>>>>>>>>>>>>>>
181 TCCCACCTCTCGGACGCTGAACCTCGCTCAACACCGATCGTCGACTATCTCCGACCCATT
241 ATTGCCGATGCCGACACGGGACACGGTGGTACCTCGGCGGTTATGAAGCTCACCAAACCTG
301 TTTGTTGAGAAAGGCGCCGCGGGCATTATCATATCGAGGACAGCGCGGGGACAAAAAAG
361 TCGGACACATGGCCGAAAGTCTTGTACCAATCCAGGAGCACATCAACCGCCTCATC
421 GCCATCCGGTTGCAGTTCGATATCATGGGTGTTGAGAACCTCGTTGTTGCGCGGACGGAC
481 TCGGAGGCTGCGACGCTCATCACAACGAACGTCGACGAGCGGGACCATGCGTTATCCTC
541 GGTGCCACAACTCGTCTCTTCAGCCACTCGTGCCTGTCATGAAGGAGGCTGAGGCGTCA
    <<<<<<<<<<<<<<<<<<
601 GGAAGACGGGCGATGCGTGAAGCTGTCGAGGACGAATGGGTGCCCAGGCAGGACTA
661 CAGCTCTTCTCCGTTACACTCGCCGACGCGCTCAAAGCCCAGACATCGGCTCGCCAGCC
721 ATTCTTGCCAAGTTTTCCGCCGAATCGCGCATGCGGCTACTCTGACGCTGTATCATC
781 GCCCAAAGGAATTC
```

KEYS (in order of precedence):
>>>>> left primer
<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	326	20	59.33	55.00	0.00	0.00	0.00	TTCATATCGAGGACCAGGCG
RIGHT PRIMER	788	20	59.19	50.00	0.00	0.00	0.00	TTTTGGGCGATGATGACAGC
PRODUCT SIZE: 463, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	231	20	59.13	55.00	0.00	0.00	0.00	CCGACCCATTATTGCCGATG
RIGHT PRIMER	674	20	58.53	55.00	0.00	0.00	0.00	ACGGAGAAGAGCTGTAGTCC
PRODUCT SIZE: 444, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

```

3 LEFT PRIMER      149  20  58.48  50.00  0.00  0.00  0.00  TCTTCCATGACCGCAAACAG
  RIGHT PRIMER     570  20  59.11  55.00  0.00  0.00  0.00  GAGTGGCTGAAGAGACGAGT
  PRODUCT SIZE: 422, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER      39   20  58.98  55.00  0.00  0.00  0.00  ATGGCAGTCGTCTAGTACCG
  RIGHT PRIMER     510  20  59.91  55.00  0.00  0.00  0.00  GTTCGTTGTGATGAGCGTCG
  PRODUCT SIZE: 472, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2291	0	0	0	0	170	0	520	872	0	0	25	20	0	684
Right	2376	0	0	0	0	185	0	266	1273	0	0	21	0	0	631

Pair Stats:

considered 1524, unacceptable product size 1516, primer in pair overlaps a primer in a better pair 128, ok 8
 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

PRODUCT SIZE: 490, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

4 LEFT PRIMER 139 20 58.44 50.00 9.88 0.00 0.00 GTGACGGTCTTCAACAACGA
RIGHT PRIMER 596 20 58.75 60.00 0.00 0.00 0.00 GGATACTACCGCTACCAGGG
PRODUCT SIZE: 458, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	2130	0	0	0	0	25	0	543	871	0	0	56	0	0	635
Right	2130	0	0	0	0	246	0	252	1030	0	0	1	0	0	601

Pair Stats:

considered 257, unacceptable product size 250, primer in pair overlaps a primer in a better pair 204, ok 7
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

Primer3 Output

PRIMER PICKING RESULTS FOR CCPC3399.b1

Template masking not selected
No mispriming library specified
Using 1-based sequence positions

OLIGO	start	len	tm	gc%	any_th	3'_th	hairpin	seq
LEFT PRIMER	44	20	59.47	55.00	14.27	1.56	0.00	TCTGTTTCGACGAATGGAGGG
RIGHT PRIMER	309	20	58.90	55.00	0.00	0.00	0.00	GCTAGAGAAGTACGCCTGGT

SEQUENCE SIZE: 494
INCLUDED REGION SIZE: 494

PRODUCT SIZE: 266, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

```
1 ATTCAAGCCAGTTAGTGGAGGATTCACGGGGACGATTCTTGGTCTGTTTCGACGAATGGA
      >>>>>>>>>>>>>>>>>>

61 GGGGCTATGGACCCGTTCTCCAAGCCGGCAATCTACCATTGGGCTCGAGTACTCAAC
    >>>

121 ACGGTCTCTCTGCAGATAGAGGCGGTCAATAGGACCACATACGCGTTTAGATATAAGAGC

181 GGATCCGAGTGGACGACTGTGCGGTGGGGCAATCAAGCCAGTTAGTGGAGGATTCACG

241 GGGACGATTCTTGGTCTGTTTCGCGACTGGAATGGAAAAAATATTAGGGACCAGGCGTAC
      <<<<<<<<<<<<<<<<<<

301 TTCTCTAGCCTATCATACCAAGGAATCATGACGTATTCTGAACCTCAAATGAATTCCTC
    <<<<<<<<<<

361 GGTTCATTCAAAAAAAAAAAAAAAAAAAAAAAAAATCAAAAAAAAAAAAAAAAAAAAAAAAA
    <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

421 AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAGAAA

481 AAAAAAAAAAGGGGG
```

KEYS (in order of precedence):
>>>>> left primer
<<<<< right primer

ADDITIONAL OLIGOS

	start	len	tm	gc%	any_th	3'_th	hairpin	seq
1 LEFT PRIMER	53	20	59.96	60.00	0.00	0.00	0.00	CGAATGGAGGGGCTATGGAC
RIGHT PRIMER	303	20	58.81	55.00	0.00	0.00	0.00	GAAGTACGCCTGGTCCCTAA
PRODUCT SIZE: 251, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
2 LEFT PRIMER	50	19	58.95	57.89	0.00	0.00	0.00	CGACGAATGGAGGGGCTAT
RIGHT PRIMER	305	19	59.48	63.16	0.00	0.00	0.00	GAGAAGTACGCCTGGTCCC
PRODUCT SIZE: 256, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								
3 LEFT PRIMER	114	20	59.68	55.00	0.00	0.00	0.00	ACTCAACACGGTCTCTCTGC
RIGHT PRIMER	363	21	57.28	42.86	7.93	6.28	0.00	ACCGAGGAATTCATTGAGGT
PRODUCT SIZE: 250, PAIR ANY_TH COMPL: 5.93, PAIR 3'_TH COMPL: 8.01								
4 LEFT PRIMER	82	20	59.74	50.00	31.54	6.84	0.00	AAGCCGGCAATCCTACCATT
RIGHT PRIMER	335	22	58.19	45.45	0.00	0.00	0.00	ACGTCATGATTCCCTTGGTATG
PRODUCT SIZE: 254, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00								

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high		high		
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1470	0	0	0	0	15	0	378	413	0	0	138	0	0	524
Right	1407	0	0	0	0	737	0	389	65	0	0	3	28	0	185

Pair Stats:

considered 34810, unacceptable product size 34804, primer in pair overlaps a primer in a better pair 2350, ok 6 libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)

RIGHT PRIMER 511 20 58.41 50.00 0.00 0.00 0.00 GCTGAAGAAAGACAACCCGT
PRODUCT SIZE: 412, PAIR ANY_TH COMPL: 0.00, PAIR 3'_TH COMPL: 0.00

Statistics

	con	too	in	in	not	no	tm	tm	high	high	high	high	high	high	
	sid	many	tar	excl	ok	bad	GC	too	too	any_th	3'_th	hair-	poly	end	
	ered	Ns	get	reg	reg	GC%	clamp	low	high	compl	compl	pin	X	stab	ok
Left	1526	0	0	0	0	127	0	452	451	0	0	18	19	0	459
Right	1527	0	0	0	0	35	0	310	616	1	0	26	19	0	520

Pair Stats:

considered 628, unacceptable product size 623, primer in pair overlaps a primer in a better pair 266, ok 5
libprimer3 release 2.4.0

(primer3_results.cgi release 4.1.0)