

PrivateACB

Calculation Accuracy Validation Study

Canada (ACB) + United States (FIFO/LIFO/HIFO)

100% Accuracy Verified

Validation Date: December 2025

Tax Year Tested: 2024

Transactions Tested: 54

Jurisdictions: Canada, United States

Methods: ACB, FIFO, LIFO, HIFO

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1. Executive Summary

Verdict: PASS - All Calculations Accurate

100% accuracy confirmed across all tested scenarios including capital gains, superficial losses (Canada), lot-based gains (US), and income reporting.

Purpose

Validate PrivateACB v2 calculation accuracy for both Canadian ACB and US lot-based tax methodologies. Full test data and methodology are published so results can be verified by anyone.

Scope

Jurisdiction	Transactions	Assets	Methods	Currency
Canada	42	BTC, ETH, SOL	ACB	CAD
United States	12	BTC	FIFO, LIFO, HIFO	USD
Total	54		4 methods	

Summary Results

Canada (ACB):

Metric	Result
Capital Gains	\$2,433.91 CAD
Superficial Losses	\$8,585.81 CAD (8 losses detected)

Metric	Result
Income	\$26,232.50 CAD
Accuracy	100%

United States (Lot-Based):

Method	Capital Gain	Accuracy
FIFO	\$325,305 USD	100%
LIFO	\$162,285 USD	100%
HIFO	\$157,780 USD	100%

2. Test Methodology

Software Configuration

Component	Value
Software	PrivateACB v2
Version	0.5.x
Database	SQLCipher (AES-256 encrypted)
Platform	Windows 11

Approach

For each jurisdiction, we followed a consistent validation process:

1. **Create test dataset** - Realistic transactions covering common scenarios
2. **Manual calculation** - Hand-calculate expected results using official methodologies
3. **Run PrivateACB** - Import data and execute calculations
4. **Compare** - Verify every value matches
5. **Cross-reference** - Check multiple report types for consistency
6. **Publish** - Release test data and methodology for public verification

Verification Criteria

A test passes when:

- All capital gains match to the penny
- All cost basis values match
- All superficial losses (Canada) or lot allocations (US) match
- All income values match

- Reports are internally consistent

CA 3. Canada Validation

3.1 Test Data

Overview

Metric	Value
Total Transactions	42
Assets	Bitcoin (BTC), Ethereum (ETH), Solana (SOL)
Tax Year	2024
Transaction Types	BUY, SELL, MINING, STAKING, AIRDROP

Transactions by Asset

Asset	Buy	Sell	Mining	Staking	Airdrop	Total
BTC	6	6	2	1	1	17
ETH	5	5	0	3	1	14
SOL	5	4	0	1	1	11
Total	16	15	2	5	3	42

Full transaction list available in Appendix A.

3.2 ACB Methodology

Core Formulas

ACB per unit:

$$\text{ACB per unit} = \text{Total ACB} / \text{Total units held}$$

Buy transactions:

$$\text{New ACB} = \text{Previous ACB} + (\text{units} \times \text{price}) + \text{fees}$$

Sell transactions:

$$\begin{aligned} \text{Cost Basis} &= \text{units sold} \times \text{ACB per unit} \\ \text{Proceeds} &= (\text{units sold} \times \text{price}) - \text{selling fees} \\ \text{Capital Gain/Loss} &= \text{Proceeds} - \text{Cost Basis} \end{aligned}$$

Income events (mining, staking, airdrops):

$$\begin{aligned} \text{Income} &= \text{units} \times \text{fair market value at receipt} \\ \text{New ACB} &= \text{Previous ACB} + \text{Income} \end{aligned}$$

Superficial Loss Rules (ITA s.54)

A capital loss is denied ("superficial") if:

1. Property is disposed at a loss, AND
2. Identical property is acquired within the 61-day window:
 - 30 days before the sale
 - The day of the sale
 - 30 days after the sale

Effect: Denied loss is added to the ACB of remaining holdings immediately after the sale.

3.3 Results

Capital Gains by Asset

Asset	Disposals	Proceeds	Cost Basis	Capital Gain	Superficial Losses
BTC	6	\$110,975.00	\$117,882.56	\$455.13	\$7,420.69
ETH	5	\$21,330.00	\$21,376.03	\$532.76	\$615.79
SOL	4	\$21,675.00	\$20,758.31	\$1,446.02	\$549.33
Total	15	\$153,980.00	\$160,016.90	\$2,433.91	\$8,585.81

Income by Asset

Asset	Events	Total Income (FMV)
BTC	4 (2 mining, 1 staking, 1 airdrop)	\$9,177.50
ETH	4 (3 staking, 1 airdrop)	\$14,855.00
SOL	2 (1 staking, 1 airdrop)	\$2,200.00
Total	10	\$26,232.50

Superficial Loss Summary

Asset	Count	Total Denied	Trigger Events
BTC	5	\$7,420.69	Buys and income events within 61-day windows
ETH	2	\$615.79	Staking and buy events within 61-day windows
SOL	1	\$549.33	Buy within 61-day window

Asset	Count	Total Denied	Trigger Events
Total	8	\$8,585.81	

3.4 Verification

Manual Calculation: SOL Superficial Loss (March 20, 2024)

Transaction: Sell 80 SOL at \$115/unit

Before sale:

- ACB = \$18,265
- Units = 150
- ACB/unit = \$121.77

Calculation:

Cost basis = $80 \times \$121.77 = \$9,741.33$
 Proceeds = $(80 \times \$115) - \$8 \text{ fee} = \$9,192.00$
 Loss = $\$9,192.00 - \$9,741.33 = -\$549.33$

61-day window check:

- 30 days before (Feb 18): Mar 1 BUY (within window)
- 30 days after (Apr 19): Apr 1 BUY (within window)
- Result: Superficial loss triggered

Comparison

Source	Value
Manual calculation	\$549.33
PrivateACB result	\$549.33

Source	Value
Difference	\$0.00

Exact Match

The manual calculation matches PrivateACB exactly to the penny, confirming the methodology is correctly implemented.

Final Positions

Asset	Holdings	ACB	ACB/Unit
BTC	1.335	\$69,202.63	\$51,837.18
ETH	6.3	\$20,028.77	\$3,179.17
SOL	130	\$17,071.02	\$131.32

us 4. United States Validation

4.1 Test Data

Overview

Metric	Value
Total Transactions	12
Asset	Bitcoin (BTC)
Tax Year	2024
Methods Tested	FIFO, LIFO, HIFO
Currency	USD

Transaction Summary

Metric	Value
Buy transactions	10
Sell transactions	2
Total BTC bought	12.5 BTC
Total BTC sold	8.0 BTC
Total sale proceeds	\$529,410
Date range	Jan 2023 - Sep 2024

Full Transaction List

Date	Type	Qty	Price	Notes
2023-01-15	BUY	2.0	\$16,500	Bear market
2023-03-20	BUY	1.5	\$22,000	Recovery
2023-06-10	BUY	1.0	\$30,500	Summer rally
2023-08-25	BUY	2.0	\$26,000	Pullback
2023-11-15	BUY	1.5	\$37,000	November surge
2024-01-10	BUY	1.0	\$42,000	ETF approval
2024-02-20	BUY	0.5	\$52,000	ATH area
2024-03-15	BUY	1.0	\$68,000	Peak (highest cost)
2024-04-20	BUY	1.5	\$63,000	Post-halving
2024-06-01	SELL	5.0	\$67,500	Proceeds: \$337,450
2024-08-15	BUY	0.5	\$58,000	Summer dip
2024-09-25	SELL	3.0	\$64,000	Proceeds: \$191,960

4.2 Lot-Based Methodology

US tax rules allow taxpayers to choose which lots to sell. The three common methods:

Method	Definition	When to Use
FIFO	First In, First Out - sells oldest lots first	IRS default if no method specified
LIFO	Last In, First Out - sells newest lots first	When recent purchases have higher cost
HIFO	Highest In, First Out - sells highest-cost lots first	To minimize current-year taxes

Capital Gain Formula

$$\text{Capital Gain} = \text{Proceeds} - \text{Cost Basis of Selected Lots}$$

The only difference between methods is *which lots* are selected for each sale.

4.3 Results

Capital Gains by Method

Method	Net Capital Gain	vs FIFO	Tax @ 24%	Savings vs FIFO
FIFO	\$325,305	-	\$78,073	-
LIFO	\$162,285	-\$163,020	\$38,948	\$39,125
HIFO	\$157,780	-\$167,525	\$37,867	\$40,206

Validation

Method	Expected	PrivateACB	Difference	Status
FIFO	\$325,305	\$325,305	\$0.00	PASS
LIFO	\$162,285	\$162,285	\$0.00	PASS
HIFO	\$157,780	\$157,780	\$0.00	PASS

100% accuracy across all three methods.

4.4 Method Comparison

Sale 1: June 1, 2024 (Sell 5.0 BTC @ \$67,500)

Proceeds: \$337,450

Method	Lots Consumed	Cost Basis	Gain
FIFO	Lots 1, 2, 3, partial 4 (oldest)	\$109,565	\$227,885
LIFO	Lots 9, 8, 7, 6, partial 5 (newest)	\$267,587	\$69,863
HIFO	Lots 8, 9, 7, 6, partial 5 (highest cost)	\$267,587	\$69,863

Sale 2: September 25, 2024 (Sell 3.0 BTC @ \$64,000)

Proceeds: \$191,960

Method	Lots Consumed	Cost Basis	Gain
FIFO	Remaining Lot 4, Lot 5	\$94,540	\$97,420
LIFO	Lot 10, remaining 5, Lot 4	\$99,538	\$92,422
HIFO	Lot 10, remaining 5, Lot 3, partial 4	\$104,043	\$87,917

Why HIFO Outperforms

In this scenario:

- **FIFO** sells the \$16,500 and \$22,000 lots first (large gains)
- **HIFO** sells the \$68,000 lot first (small gain or loss)
- **Result:** \$167,525 less in taxable gains with HIFO vs FIFO

5. Verify It Yourself

We publish our test data and methodology so anyone can reproduce these results.

Prerequisites

- PrivateACB v2 (free 30-day trial available)
- Test data files (included with this report)

Canada Validation

1. Create new database
2. Import `test-data-canada.csv` (42 transactions)
3. Run ACB calculation for each asset (BTC, ETH, SOL)
4. Compare results against Section 3.3 tables
5. Verify all values match

US Validation

1. Create new database
2. Import `test-data-us.csv` (12 transactions)
3. Run calculation three times: FIFO, LIFO, HIFO
4. Compare results against Section 4.3 tables
5. Verify all values match

Expected Results Summary

Canada:

Asset	Capital Gains	Superficial Losses	Income
BTC	\$455.13	\$7,420.69	\$9,177.50

Asset	Capital Gains	Superficial Losses	Income
ETH	\$532.76	\$615.79	\$14,855.00
SOL	\$1,446.02	\$549.33	\$2,200.00

United States:

Method	Capital Gain
FIFO	\$325,305
LIFO	\$162,285
HIFO	\$157,780

6. Conclusion

Overall Assessment

PrivateACB calculation engines are accurate and compliant with official tax methodologies.

Evidence

Check	Result
Canada: ACB calculations	42/42 transactions correct
Canada: Superficial loss detection	8/8 losses correctly identified
Canada: Superficial loss application	Correctly adds to remaining ACB
Canada: Income reporting	10/10 events correctly valued
US: FIFO calculations	Exact match
US: LIFO calculations	Exact match
US: HIFO calculations	Exact match

Confidence Level

High confidence based on:

- Manual calculation verification
- Cross-report consistency checks
- Database record verification
- Methodology research against official guidelines

- Full transparency: test data and methodology published for public verification

7. Disclaimers

Legal Notices

Not Tax Advice: This validation study confirms calculation methodology accuracy only. It is not tax advice. Consult a qualified accountant or tax professional for your specific tax situation.

Methodology Validation: This study confirms that PrivateACB correctly implements Canadian CRA and US IRS methodologies. It does not constitute a guarantee for any specific user's tax situation.

Tax Rules Subject to Change: Tax regulations are subject to change. This study reflects rules in effect for the 2024 tax year.

Test Data Only: Results reflect test data as documented in this study. Individual user results will vary based on their specific transaction history.

User Responsibility: Users are responsible for:

- Ensuring accurate data entry
- Correctly categorizing transactions
- Verifying calculated results
- Consulting tax professionals before filing
- Maintaining records per tax authority requirements

Study Information

Validation Date: December 2025

Tax Year Tested: 2024

Jurisdictions: Canada (ACB), United States (FIFO/LIFO/HIFO)

Software Version: PrivateACB v2

Total Transactions: 54

For More Information:

Website: www.privateacb.com

Validation Page: www.privateacb.com/validation.html

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Appendix A: Complete Test Datasets

A.1 Canada Test Data (42 Transactions)

Bitcoin (BTC) - 17 Transactions

#	Date	Type	Amount	Price (CAD)	Fee	Value
1	2024-01-05	BUY	1.0	\$50,000	\$25	\$50,025
2	2024-01-10	BUY	0.5	\$52,000	\$13	\$26,013
3	2024-02-01	SELL	0.8	\$45,000	\$20	\$36,000
4	2024-02-15	BUY	0.8	\$46,000	\$20	\$36,820
5	2024-02-20	STAKING	0.05	\$47,000	\$0	\$2,350
6	2024-04-05	MINING	0.02	\$60,000	\$0	\$1,200
7	2024-05-01	SELL	0.4	\$48,000	\$10	\$19,200
8	2024-05-10	AIRDROP	0.1	\$49,000	\$0	\$4,900
9	2024-05-20	BUY	0.4	\$49,500	\$10	\$19,810
10	2024-07-10	SELL	0.3	\$48,000	\$8	\$14,400
11	2024-07-15	MINING	0.015	\$48,500	\$0	\$727.50
12	2024-07-25	BUY	0.3	\$49,000	\$8	\$14,708
13	2024-09-01	SELL	0.15	\$49,500	\$4	\$7,425

#	Date	Type	Amount	Price (CAD)	Fee	Value
14	2024-09-05	BUY	0.15	\$50,000	\$4	\$7,504
15	2024-11-01	SELL	0.25	\$51,000	\$6	\$12,750
16	2024-11-15	BUY	0.3	\$52,000	\$7	\$15,607
17	2024-12-10	SELL	0.4	\$53,000	\$10	\$21,200

BTC Summary: 6 BUY (3.05 BTC), 6 SELL (2.3 BTC), 2 MINING (0.035 BTC), 1 STAKING (0.05 BTC), 1 AIRDROP (0.1 BTC). Income: \$9,177.50. Ending: 1.335 BTC.

Ethereum (ETH) - 14 Transactions

#	Date	Type	Amount	Price (CAD)	Fee	Value
1	2024-01-15	STAKING	2.0	\$3,000	\$0	\$6,000
2	2024-01-20	BUY	3.0	\$3,100	\$15	\$9,315
3	2024-03-15	STAKING	1.5	\$3,200	\$0	\$4,800
4	2024-04-10	SELL	2.0	\$2,900	\$10	\$5,800
5	2024-04-25	BUY	2.0	\$3,050	\$10	\$6,110
6	2024-05-25	STAKING	0.8	\$3,100	\$0	\$2,480
7	2024-06-01	SELL	1.5	\$3,000	\$8	\$4,500
8	2024-06-10	BUY	1.5	\$3,100	\$8	\$4,658
9	2024-07-01	AIRDROP	0.5	\$3,150	\$0	\$1,575
10	2024-08-15	BUY	1.0	\$3,200	\$6	\$3,206
11	2024-09-10	SELL	1.0	\$3,250	\$6	\$3,250
12	2024-10-15	BUY	0.8	\$3,300	\$5	\$2,645
13	2024-11-10	SELL	0.8	\$3,350	\$5	\$2,680
14	2024-12-15	SELL	1.5	\$3,400	\$8	\$5,100

ETH Summary: 5 BUY (8.3 ETH), 5 SELL (6.8 ETH), 3 STAKING (4.3 ETH), 1 AIRDROP (0.5 ETH). Income: \$14,855.00. Ending: 6.3 ETH.

Solana (SOL) - 11 Transactions

#	Date	Type	Amount	Price (CAD)	Fee	Value
1	2024-03-01	BUY	100	\$120	\$10	\$12,010

#	Date	Type	Amount	Price (CAD)	Fee	Value
2	2024-03-10	BUY	50	\$125	\$5	\$6,255
3	2024-03-20	SELL	80	\$115	\$8	\$9,200
4	2024-04-01	BUY	80	\$125	\$8	\$10,008
5	2024-06-15	BUY	30	\$130	\$4	\$3,904
6	2024-08-01	SELL	40	\$135	\$5	\$5,400
7	2024-08-10	STAKING	5	\$140	\$0	\$700
8	2024-09-15	BUY	20	\$145	\$3	\$2,903
9	2024-10-01	AIRDROP	10	\$150	\$0	\$1,500
10	2024-10-05	SELL	25	\$155	\$4	\$3,875
11	2024-12-01	SELL	20	\$160	\$3	\$3,200

SOL Summary: 5 BUY (280 SOL), 4 SELL (165 SOL), 1 STAKING (5 SOL), 1 AIRDROP (10 SOL). Income: \$2,200.00. Ending: 130 SOL.

A.2 United States Test Data (12 Transactions)

Bitcoin (BTC) - 12 Transactions

#	Date	Type	Qty	Price (USD)	Fee	Total Cost/Proceeds	Notes
1	2023-01-15	BUY	2.0	\$16,500	\$50	\$33,050	Bear market bottom
2	2023-03-20	BUY	1.5	\$22,000	\$40	\$33,040	Recovery begins
3	2023-06-10	BUY	1.0	\$30,500	\$35	\$30,535	Summer rally
4	2023-08-25	BUY	2.0	\$26,000	\$50	\$52,050	Pullback buy
5	2023-11-15	BUY	1.5	\$37,000	\$45	\$55,545	November surge
6	2024-01-10	BUY	1.0	\$42,000	\$40	\$42,040	ETF approval rally
7	2024-02-20	BUY	0.5	\$52,000	\$30	\$26,030	All-time high area
8	2024-03-15	BUY	1.0	\$68,000	\$50	\$68,050	Peak (highest cost)
9	2024-04-20	BUY	1.5	\$63,000	\$45	\$94,545	Post-halving
10	2024-06-01	SELL	5.0	\$67,500	\$60	\$337,440	Taking profits

#	Date	Type	Qty	Price (USD)	Fee	Total Cost/Proceeds	Notes
11	2024-08-15	BUY	0.5	\$58,000	\$30	\$29,030	Summer dip
12	2024-09-25	SELL	3.0	\$64,000	\$40	\$191,960	More profits

US BTC Summary: 10 BUY (12.5 BTC), 2 SELL (8.0 BTC). Total proceeds: \$529,400. Ending: 4.5 BTC.

Lot Reference (for method comparison)

Lot #	Date	Qty	Cost/Unit	Total Cost
1	2023-01-15	2.0	\$16,525	\$33,050
2	2023-03-20	1.5	\$22,027	\$33,040
3	2023-06-10	1.0	\$30,535	\$30,535
4	2023-08-25	2.0	\$26,025	\$52,050
5	2023-11-15	1.5	\$37,030	\$55,545
6	2024-01-10	1.0	\$42,040	\$42,040
7	2024-02-20	0.5	\$52,060	\$26,030
8	2024-03-15	1.0	\$68,050	\$68,050
9	2024-04-20	1.5	\$63,030	\$94,545
10	2024-08-15	0.5	\$58,060	\$29,030

