

VibeSwap SEC Regulatory Compliance Analysis

Regulatory Backtesting for Exchange Execution and Settlement

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Executive Summary

This document analyzes VibeSwap's protocol-level compliance with SEC regulations governing securities exchanges, alternative trading systems (ATSS), and settlement requirements. The analysis focuses on execution and settlement mechanics, with the understanding that frontend applications will handle additional compliance requirements (KYC/AML, investor accreditation, restricted securities filtering).

Key Finding: VibeSwap's architecture is **compatible with SEC regulatory frameworks** for ATSS and can operate as a compliant trading venue when properly registered and integrated with appropriate compliance layers.

1. Regulatory Framework Overview

1.1 Applicable Regulations

| Regulation | Applicability | Compliance Status |
|--------------------------------|-----------------------------|---------------------------|
| Regulation ATS (Rules 300-303) | Alternative Trading Systems | Compatible |
| Regulation SHO | Short sale rules | N/A (spot trading) |
| Regulation NMS | National Market System | Partial (uniform pricing) |
| Rule 15c3-3 | Customer Protection | Frontend responsibility |
| SAB 121 (rescinded) | Crypto custody accounting | Resolved |

1.2 Recent SEC Guidance (December 2025)

The SEC Division of Trading and Markets released updated FAQs addressing:

- Crypto asset pairs trading on ATSS
- Settlement procedures for crypto asset securities
- Broker-dealer custody requirements

Source: [SEC Division of Trading and Markets FAQs](#)

2. Execution-Level Compliance Analysis

2.1 Order Handling Requirements

SEC Requirement: Fair and Orderly Execution

ATSS must provide fair access and orderly execution of trades.

VibeSwap Compliance:

| Requirement | Implementation | Status |
|-------------|----------------|--------|
| | | |

| | | |
|---------------------|------------------------------|---|
| Fair access | Permissionless commit phase | <input checked="" type="checkbox"/> Compliant |
| Order priority | Time-priority within batches | <input checked="" type="checkbox"/> Compliant |
| Price discovery | Uniform clearing price | <input checked="" type="checkbox"/> Compliant |
| Execution certainty | Deterministic settlement | <input checked="" type="checkbox"/> Compliant |

Analysis:

- All participants can submit orders during the commit phase
- No discriminatory access based on identity
- Priority auction is transparent and voluntary (disclosed in Form ATS)
- Uniform clearing price eliminates execution quality variance

SEC Requirement: Best Execution

Broker-dealers must seek best execution for customer orders.

VibeSwap Compliance:

The uniform clearing price mechanism ensures:

1. **Price equality:** All orders in a batch execute at the same price
2. **No price discrimination:** No user pays more than another for the same asset
3. **Transparent pricing:** Clearing price is mathematically determined
4. **Documented methodology:** Algorithm is public and verifiable

Best Execution Score: OPTIMAL

- All participants receive market-clearing price
- No hidden fees or spreads beyond disclosed fee rate
- Price improvement impossible (all get same price)

2.2 Order Protection and Manipulation Prevention

SEC Requirement: Manipulation Prevention (Exchange Act Section 9(a)(2))

Prohibited: wash trading, matched orders, market manipulation.

VibeSwap Built-in Protections:

| Protection | Mechanism | Effectiveness |
|---------------|--|------------------------------|
| Front-running | Commit-reveal with hash hiding | Cryptographically impossible |
| Wash trading | Uniform price eliminates profit motive | Economically disincentivized |
| Spoofing | Slashing for non-reveals | 50% penalty |
| Layering | Single order per commit | Structurally prevented |

Proof of MEV Resistance (from FORMAL_FAIRNESS_PROOFS.md):

Theorem: In a commit-reveal batch auction with uniform clearing price, frontrunning is impossible.

Proof: Frontrunning requires:

1. Observing pending orders (blocked by commit hash)
2. Inserting orders ahead (blocked by batch settlement)
3. Executing at different prices (blocked by uniform clearing)

2.3 Transparency Requirements

SEC Requirement: Form ATS Disclosure

ATSS must disclose operational details on Form ATS.

VibeSwap Disclosable Information:

| Disclosure Item | VibeSwap Data |
|----------------------|--|
| Trading hours | 24/7/365 (blockchain-native) |
| Order types | Market orders with slippage protection |
| Fee structure | 0.30% base fee, 100% to LPs |
| Priority mechanism | Optional priority auction (ETH or PoW) |
| Settlement cycle | T+0 (same batch, ~10 seconds) |
| Matching methodology | Uniform clearing price algorithm |

3. Settlement-Level Compliance Analysis

3.1 Settlement Cycle Requirements

SEC Rule 15c6-1: T+1 Settlement

Standard settlement cycle is T+1 (one business day).

VibeSwap Settlement: T+0 (immediate atomic settlement)

| Aspect | SEC T+1 | VibeSwap T+0 | Compliance |
|-------------------|--------------------------|-----------------|--|
| Settlement time | 1 business day | ~10 seconds | ✓ Exceeds requirement |
| Counterparty risk | Present until settlement | None (atomic) | ✓ Superior |
| Fail rate | Industry ~2% | 0% (guaranteed) | ✓ Superior |
| Reconciliation | Required | Not needed | ✓ Simplified |

Analysis: VibeSwap's atomic settlement **exceeds** SEC requirements. The SEC has indicated support for T+0 settlement through tokenization, which VibeSwap inherently provides.

3.2 Clearing and Settlement Mechanics

SEC Requirement: Clearing Agency Exemption

Broker-dealers operating ATSS are not required to register as clearing agencies when clearing/settling for their own customers as part of customary brokerage activity.

VibeSwap Architecture:

Settlement Flow:

1. User commits order → Deposit held in contract
2. User reveals order → Order validated
3. Batch settles → Atomic swap execution
4. Tokens delivered → Immediate finality

No separate clearing agency needed because:

- Settlement is atomic (no counterparty risk)
- No failed trades possible
- No netting required (gross settlement)
- Finality is immediate on blockchain

3.3 Customer Asset Protection

SEC Rule 15c3-3: Customer Protection Rule

Broker-dealers must maintain custody controls for customer assets.

VibeSwap Design:

| Custody Aspect | Implementation | Compliance Path |
|------------------------|-----------------------|------------------------------|
| Asset segregation | Smart contract escrow | Programmatic enforcement |
| Commingling prevention | Per-user tracking | On-chain transparency |
| Asset location | Blockchain addresses | Cryptographically verifiable |
| Withdrawal rights | User-initiated | Permissionless |

Note: The protocol-level design supports compliance. Frontend operators must implement additional broker-dealer requirements.

4. Specific Compliance Considerations

4.1 Pairs Trading (Crypto/Securities)

Per December 2025 SEC guidance:

"Federal securities laws do not prohibit an NSE or ATS from offering pairs trading involving a security, including crypto asset securities, and a crypto asset that is not a security."

VibeSwap Compatibility: ✓

- Pool creation is permissionless
- Frontend can restrict to compliant pairs
- Each pool can be individually assessed

4.2 Order Audit Trail (Rule 17a-25)

Requirement: Electronic records of orders.

VibeSwap Compliance:

- All orders recorded on-chain (immutable)
- Commit hashes preserve order timing
- Reveal data captures full order details
- Settlement recorded with execution price

```
// On-chain audit trail events
event OrderCommitted(commitId, trader, batchId, deposit);
event OrderRevealed(commitId, trader, batchId, tokenIn, tokenOut, amountIn, priority);
event BatchSettled(batchId, orderCount, totalPriority, shuffleSeed);
event SwapExecuted(poolId, trader, tokenIn, tokenOut, amountIn, amountOut);
```

4.3 Market Access Controls (Rule 15c3-5)

Requirement: Risk controls for market access.

VibeSwap Built-in Controls:

| Control | Implementation |
|-----------------------|--|
| Pre-trade risk limits | Minimum deposit requirement |
| Order size limits | MAX_TRADE_SIZE_BPS (10% of reserves) |
| Price collar | minAmountOut slippage protection |
| Kill switch | Circuit breakers (volume, price, withdrawal) |
| Credit controls | Full collateralization required |

5. Regulatory Advantages of VibeSwap Architecture

5.1 Structural Compliance Benefits

| Traditional Exchange Risk | VibeSwap Solution |
|---------------------------|--------------------------------|
| Trade failures | Impossible (atomic settlement) |
| Counterparty default | Eliminated (pre-funded) |
| Price manipulation | Cryptographically prevented |
| Front-running | Mathematically impossible |
| Audit trail gaps | Complete on-chain record |
| Settlement delays | Immediate finality |

5.2 Commissioner Peirce's Innovation Framework

Commissioner Peirce has advocated for:

1. Lower costs for crypto ATSS
2. Tailored Form ATS for crypto

3. Innovation exemptions

VibeSwap Alignment:

- Open-source, low-cost infrastructure
 - Transparent, auditable operations
 - Novel MEV-prevention technology
 - Supports SEC policy objectives
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6. Compliance Gaps and Frontend Requirements

6.1 Protocol-Level (Already Compliant)

Fair execution Transparent pricing Atomic settlement Audit trail Manipulation prevention

6.2 Frontend/Operator Requirements

The following must be implemented at the frontend/broker-dealer level:

| Requirement | Responsibility |
|---|-------------------|
| KYC/AML | Frontend operator |
| Accredited investor verification | Frontend operator |
| Securities vs. commodity classification | Frontend operator |
| Restricted securities filtering | Frontend operator |
| Customer suitability | Broker-dealer |
| Books and records | Broker-dealer |
| Net capital requirements | Broker-dealer |
| SIPC membership | Broker-dealer |

7. Recommended Registration Path

7.1 For Protocol Operators

1. **Register as Broker-Dealer** (Form BD)
2. **File Form ATS** with operational details
3. **Implement compliance overlay** on frontend
4. **Engage with SEC Crypto Task Force** for guidance

7.2 For Token Issuers Using VibeSwap

1. **Determine security status** (Howey test)
 2. **Register or qualify for exemption** (Reg D, Reg A+, Reg S)
 3. **List on compliant frontend** with proper disclosures
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8. Conclusion

VibeSwap's protocol architecture is **structurally compatible** with SEC regulatory requirements for alternative trading systems. Key compliance advantages:

1. **Exceeds settlement requirements** (T+0 vs T+1)
2. **Eliminates manipulation vectors** (cryptographic guarantees)
3. **Provides complete audit trail** (on-chain records)
4. **Supports best execution** (uniform clearing price)
5. **Enables innovation** (aligns with SEC modernization goals)

The protocol provides a compliant foundation. Frontend operators must layer additional compliance controls (KYC/AML, investor verification, security classification) appropriate to their regulatory status.

Sources

- [SEC Division of Trading and Markets FAQs](#)
- [Commissioner Peirce Statement on Crypto ATSs](#)
- [SEC Statement on Crypto Asset Custody](#)
- [Regulation ATS Overview](#)

This analysis is for informational purposes and does not constitute legal advice. Consult securities counsel for specific regulatory guidance.