

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SAB 121 (rescinded)	Crypto custody accounting	Resolved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
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Fair access	Permissionless commit phase	✅ Compliant
Order priority	Time-priority within batches	✅ Compliant
Price discovery	Uniform clearing price	✅ Compliant
Execution certainty	Deterministic settlement	✅ 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](#)
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This analysis is for informational purposes and does not constitute legal advice. Consult securities counsel for specific regulatory guidance.