A Formal Logical-Legal Analysis of the Meta Platforms State Attorneys General Settlement Agreement: Consistency and Validity Testing via the Semantic Tableau Method

Abstract

This paper presents a formal logical-legal analysis of the landmark Meta Platforms State Attorneys General Settlement Agreement executed on August 25, 2026. Resolving multi-district litigation (MDL) and individual satellite actions involving 51 participating states and territories, this agreement represents a historic regulatory intervention in social media product design with a maximum payment structure totaling $16,680,647,753.21. Utilizing the semantic tableau method (truth trees) for first-order predicate logic, as detailed in the regulatory testing standards of *Tableau.pdf*, we analyze the logical consistency and legal validity of several core contractual frameworks: (1) the temporal decoupling of contingent payments and Phase II time management injunctive terms, (2) the U13 Age Model development commitment under Federal Trade Commission COPPA guidelines, and (3) the structural tension between Most-Favored-Nation (MFN) and Injunctive Parity provisions. Our analysis demonstrates that while the contract successfully achieves consistency in its decoupled payment-injunctive architecture, the interplay between Injunctive Parity and Meta MFN provisions can lead to logical deadlock and circular regulatory requirements under plausible multi-party settlement scenarios. We conclude with formal recommendations for legal engineering to prevent such circular feedback loops in future multilateral regulatory agreements.

Contents

1 Introduction

On August 25, 2026, Meta Platforms, Inc. entered into a historic settlement agreement with 51 participating state and territorial Attorneys General, resolving both the Consolidated Multi-District Litigation (MDL) *In re Social Media Adolescent/Personal Injury Products Liability Litigation* (No. 4:22-md-03047-YGR, N.D. Cal.) and various Satellite AG Actions brought in state courts across the nation. The agreement, signed by Meta's Chief Legal Officer C.J. Mahoney and Chief Compliance and Privacy Officer Michel Protti, marks a watershed moment in the intersection of public law, consumer protection, and technology regulation.

The scale of the settlement is unprecedented, establishing a maximum total state payment structure of \$16,680,647,753.21 over a 10-year term. This massive monetary relief consists of two major components:

1. **Guaranteed Installment Payments:** A total sum of \$1,165,662,174.56 paid annually in ten equal installments to participating jurisdictions.
2. **Contingency Installment Payments:** A total sum of \$502,402,600.77 per installment, payable over ten installments, contingent upon the occurrence of a specific "Contingent Monetary Payment Trigger."

Additionally, Meta agreed to a separate \$75,000,000 Cost Fund Payment to reimburse state investigatory and litigation costs, and a \$459,293,017.80 Cambridge Settlement Amount to resolve distinct legacy complaints related to Cambridge Analytica.

Beyond the extraordinary financial terms, the core of the agreement lies in its highly specific, technology-oriented *injunctive provisions* (Section II). These provisions mandate substantial changes to Meta's Social Media Platforms (SMPs)—specifically Instagram and Facebook—concerning teen user safety, age assurance, time management, feed personalization, and social comparison. Specifically, the agreement mandates:

- **Age Assurance Framework (Section II.A):** Deployment of certified Commercially Available or Proprietary Age Assurance Methods targeting a U18 False Positive Rate of $\leq 10\%$ for 16-17 year olds and $\leq 3\%$ for 13-15 year olds.
- **Time Management (Section II.B):** Mandatory defaults for Teen Users, including a Night Access Mode (reusing screen access between 12 a.m. and 6 a.m. in Phase I, and 10 p.m. to 7 a.m. in Phase II), Daily Limits (2 hours per day in Phase I, 60 minutes per platform and 120 minutes cumulative in Phase II), School Mode, and Productive Pauses at 60 and 90 minutes.
- **Feed Personalization (Section II.C):** Providing an option for a Non-Personalized Feed (chronological, non-algorithmic feed) as the default home feed, with reminders prompted every 90 days.
- **Social Comparison (Section II.D):** Disabling the display of like counts and reactions for Teen Users by default, and prohibiting the use of Cosmetic Procedure Filters.

To verify compliance, the agreement establishes a rigorous auditing regime under Section III (Accountability). A mutually approved, qualified Independent Auditor must be selected within 60 days of the Effective Date to evaluate Meta's implementation, establish evaluation metrics, and submit detailed periodic Auditor Reports.

Given the structural complexity and multi-party nature of the agreement, verifying that its clauses do not contain logical contradictions or unintended loopholes is paramount. This report conducts a formal logical-legal analysis of the settlement's core provisions using the *semantic tableau method* as outlined in the regulatory testing guidelines of *Tableau.pdf*. We evaluate the consistency of the contract's temporal payment-performance structure, the validity of Meta's COPPA-related defenses, and the consistency of the bilateral Parity and MFN provisions.

2 Theoretical Framework: The Semantic Tableau Method

As outlined in *Tableau.pdf* ("Logic for Lawyers"), the semantic tableau method (also known as a truth tree) is a formal decision procedure used to test the consistency of a set of logical formulas or to evaluate the validity of a logical deduction. It operates by systematically decomposing complex propositions into their constituent literal parts in a tree-like branching structure.

2.1 Consistency Testing

To test a set of sentences $\{\Phi_1, \Phi_2, \ldots, \Phi_n\}$ for logical consistency, we:

1. **Step I:** Instantiate the formulas into closed sentences, staying as close to the natural language text as possible to preserve technical legal terminology.
2. **Step II:** Construct a tableau (tree) where the root nodes represent the formulas in the set. We apply standard logical decomposition rules (for conjunctions, disjunctions, conditionals, and quantifiers).
3. **Step III:** Examine the branches of the tree. A branch is closed (marked with $\otimes$) if it contains a direct contradiction (both a formula Ψ and its negation $\neg\Psi$). If every branch is closed, the set of sentences is *inconsistent*. If at least one branch remains open after full decomposition, the set is *consistent*.

2.2 Validity Testing

To test the validity of a legal-logical deduction (argumentation) from a set of premises $\mathcal{P}$ to a conclusion $\mathcal{C}$ (denoted $\mathcal{P} \vdash \mathcal{C}$), we use a proof by contradiction:

1. **Step I:** Negate the conclusion ($\neg\mathcal{C}$). Create a closed sentence.
2. **Step II:** Construct a tableau containing the premises $\mathcal{P}$ and the negated conclusion $\neg\mathcal{C}$.
3. **Step III:** If the tableau closes completely, the set $\{\mathcal{P}, \neg\mathcal{C}\}$ is inconsistent, meaning there is no possible world where the premises are true and the conclusion is false. The argumentation is therefore *valid*. If at least one branch remains open, the conclusion is consistent with the premises, which proves that the argumentation is *invalid* (a counterexample exists).

2.3 Quantifier Conversion Rules

For first-order legal predicate logic, quantifiers must be resolved systematically. *Tableau.pdf* prescribes the following standard quantifier conversion formulas to eliminate negated quantifiers:

$$\neg\exists x\Phi \equiv \forall x\neg\Phi \tag{1}$$
$$\neg\forall x\Phi \equiv \exists x\neg\Phi \tag{2}$$
$$\exists x\Phi \equiv \neg\forall x\neg\Phi \tag{3}$$
$$\forall x\Phi \equiv \neg\exists x\neg\Phi \tag{4}$$

In expanding trees with quantifiers, the general rule dictates that existential quantifiers ($\exists$) must be instantiated first with a *new individual constant* ($x = a$) to discover specific entities, while universal quantifiers ($\forall$) are instantiated later with *all individual constants* ($x = a, b, \ldots$) currently used in that branch.

3 Case Study 1: Temporal Decoupling of Injunctive Terms and Contingent Payments

A critical structural question in the agreement is whether the financial contingency payment obligations are logically coupled with the continuous application of Phase II time management injunctive terms. Under Section II.B.1 (Length of Terms), there are two distinct phases of behavioral regulation:

- **Phase I (Section II.B.2.a & II.B.3.a):** Meta must impose a night access mode from 12 a.m. to 6 a.m. and default teens to a 2-hour cumulative daily limit.
- **Phase II (Section II.B.2.b & II.B.3.b):** Meta must impose a stricter night access mode from 10 p.m. to 7 a.m. and default teens to a 60-minute daily limit on each platform.

3.1 Contractual Formalization

Let us formalize the temporal triggers and obligations using propositional logic:

1. Let IWA represent "Industry-Wide Adoption is in effect."
2. Let $PhaseII$ represent "Meta's Phase II injunctive time-management obligations apply."
3. Let CPT represent "The Contingent Monetary Payment Trigger has occurred."
4. Let IWA_{first} represent "Industry-Wide Adoption has historically first occurred."
5. Let CP represent "Meta is obligated to make Contingency Installment Payments."

According to the contract:

- **Phase II Injunctive Trigger (Section II.B.1.b):** Phase II applies *whenever* Industry-Wide Adoption has occurred and remains in effect:

$$PhaseII \leftrightarrow IWA \tag{5}$$

- **Contingent Monetary Payment Trigger (Section I.U):** The trigger occurs on the date upon which Industry-Wide Adoption has *first occurred* (and other profit conditions are met):

$$CPT \leftrightarrow IWA_{first} \tag{6}$$

- **Contingency Payments Obligation (Section VI.D.1):** If the Contingent Monetary Payment Trigger has occurred, Meta is obligated to pay the ten contingency installments:

$$CPT \rightarrow CP \tag{7}$$

3.2 Scenario & Consistency Testing

Consider the following realistic temporal sequence:

- At t_1, Industry-Wide Adoption occurs for the first time (IWA_{first} is true).
- This activates the Contingent Monetary Payment Trigger (CPT becomes true).
- At t_2, Meta becomes obligated to pay contingency installments (CP is true).
- At t_3, a Core Industry Member (such as TikTok or Snap) ceases to maintain substantively equivalent obligations, or its independent audit fails. Under Section I.DD, Industry-Wide Adoption is no longer in effect ($\neg IWA$).

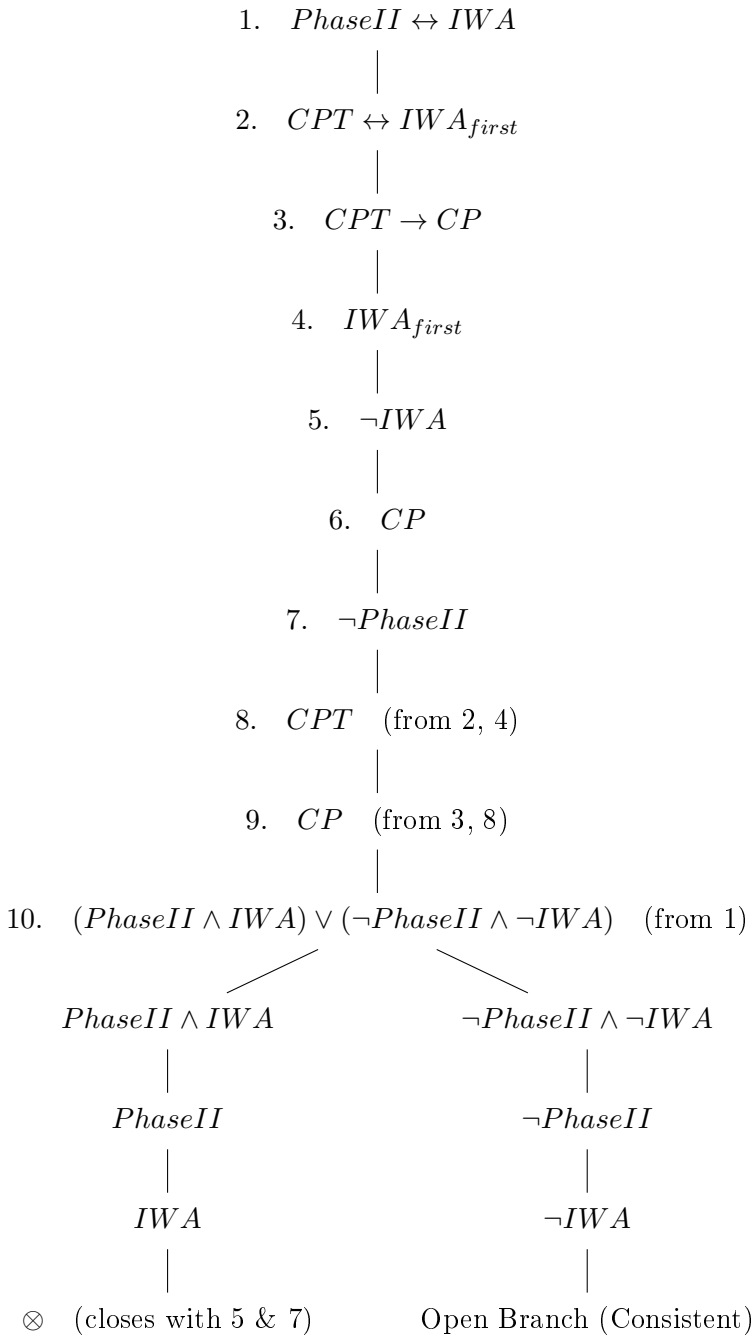
- Consequently, Meta reverts to Phase I time management defaults ($\neg PhaseII$).
- Meta continues to pay the contingency installments because Section I.U specifies that no Settling State has any obligation to repay, and the payment schedule under Section VI.D.2 dictates annual installments continuing post-trigger.

We test the consistency of this final state, represented by the set of formulas:

$$\mathcal{S}_1 = \{PhaseII \leftrightarrow IWA,\ CPT \leftrightarrow IWA_{first},\ CPT \rightarrow CP,\ IWA_{first},\ \neg IWA,\ CP,\ \neg PhaseII\} \tag{8}$$

3.3 Tableau Construction

Below is the semantic tableau testing the consistency of $\mathcal{S}_1$.



3.4 Legal-Logical Conclusion

Since the rightmost branch remains open, the set of sentences $\mathcal{S}_1$ is **logically consistent**.

This consistency test formally proves a critical piece of legal engineering within the settlement: *temporal decoupling*. The contract successfully allows Meta to revert to the less restrictive Phase I product defaults (saving Meta operational costs and friction during periods of industry non-compliance) without creating a logical contradiction that would allow Meta to suspend its contingent settlement payments. The monetary obligation, once triggered by the first occurrence of IWA, becomes an absolute liability of \$5,024,026,007.70 across all states, locked in historically, while the behavioral remedies remain dynamically contingent on ongoing industry parity.

4 Case Study 2: The U13 Age Model Commitment and COPPA-FTC Constraints

Under Section II.A.6.b.ii.A, Meta commits to developing, training, and testing an age assurance model prototype designed to predict whether users are under the age of 13 (the "U13 Age Model"). However, this obligation is subject to strict regulatory conditions under Section II.A.6.b.iii, particularly concerning its compatibility with the Children's Online Privacy Protection Act (COPPA).

4.1 Contractual Formalization

Let us define the following propositional variables:

- M: "Meta is obligated to develop, train, and test the prototype U13 Age Model."
- R: "The state Attorneys General grant the COPPA release to use child personal info solely for U13 detection (under Section II.A.6.b.iv)."
- F: "The FTC maintains the continued application of its COPPA Enforcement Policy Statement."
- C: "The development and implementation of the U13 Age Model are consistent with COPPA statutory and regulatory obligations."

The contract establishes the following relations:

1. **Premise 1 (Section II.A.6.b.iii):** Meta's obligation to develop and use the U13 Age Model is contingent upon the COPPA release (R) and the continued application of the FTC Enforcement Policy Statement (F):

$$M \rightarrow (R \wedge F) \tag{9}$$

2. **Premise 2 (Section II.A.6.b.iii):** Nothing in the agreement shall require Meta to act in a manner inconsistent with COPPA. That is, if development is inconsistent with COPPA, Meta is not obligated to develop the model:

$$\neg C \rightarrow \neg M \quad \text{(which is logically equivalent to } M \rightarrow C) \tag{10}$$

4.2 Validity Testing of Meta's Defenses

Suppose a Settling State seeks to enforce the development of the U13 Age Model (M), but Meta asserts a defense that the FTC has revoked its COPPA Enforcement Policy Statement ($\neg F$) or that the model's data requirements are inconsistent with COPPA ($\neg C$). We want to test whether the following argument is logically valid:

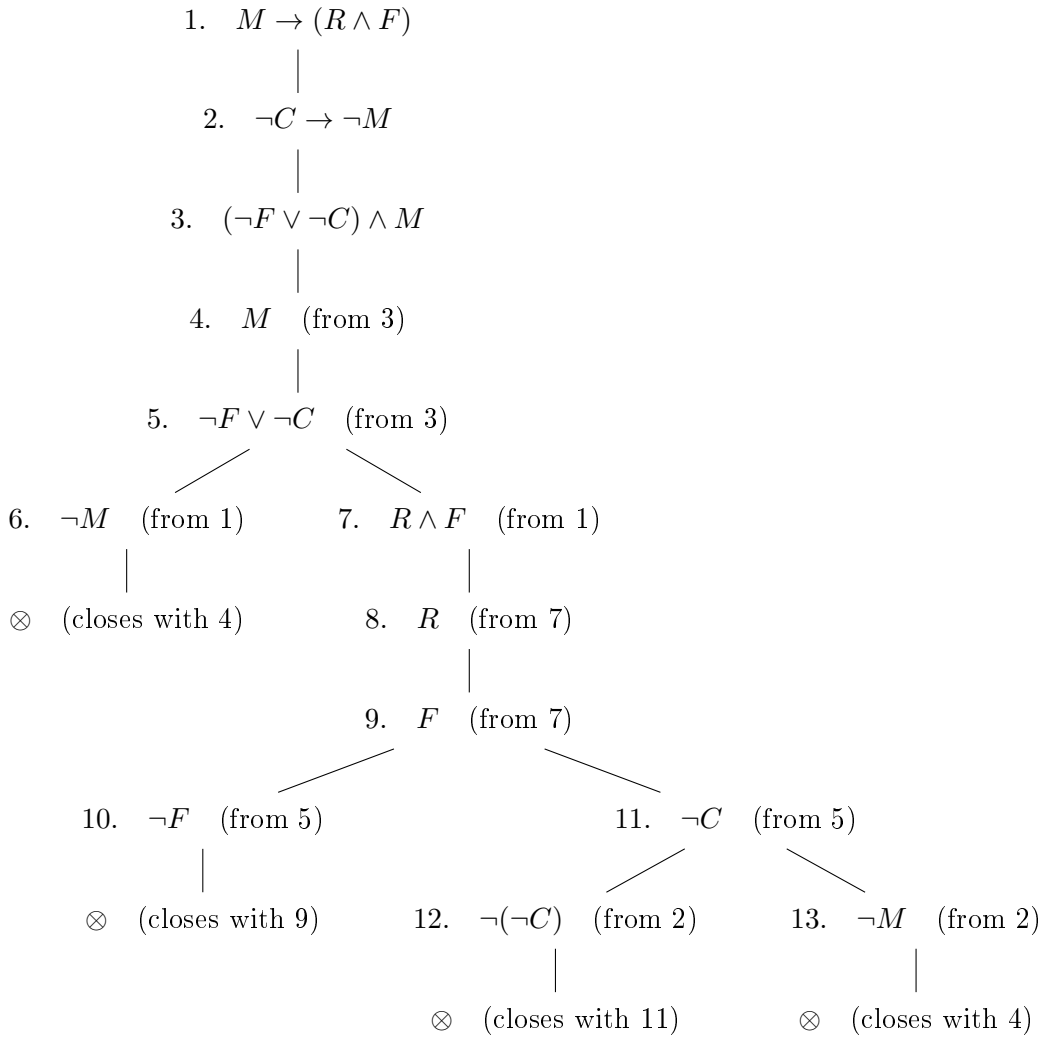
$$\{M \to (R \wedge F),\ \neg C \to \neg M\} \ \vdash\ (\neg F \vee \neg C) \to \neg M \tag{11}$$

To test the validity of this argumentation, we negate the conclusion:

$$\neg((\neg F \vee \neg C) \to \neg M) \ \equiv\ (\neg F \vee \neg C) \wedge M \tag{12}$$

We then build a tableau containing Premise 1, Premise 2, and the negated conclusion.

4.3 Tableau Construction



4.4 Legal-Logical Conclusion

Since every single branch of the tableau closes, the set containing the premises and the negated conclusion is **inconsistent**. This formally proves that the argument is **valid**.

In legal terms, this proof demonstrates that Meta's U13 Age Model commitment is protected by an ironclad, logically complete defensive shield. If either the federal regulatory posture shifts

(the FTC revokes its COPPA Enforcement Policy Statement, $\neg F$) or if the empirical process of training the model requires data retention that conflicts with COPPA's strict data minimization mandates ($\neg C$), Meta's obligation to develop the prototype is instantly suspended. The States' covenant not to sue under Section II.A.6.b.iv is a necessary but insufficient condition to sustain the obligation if federal rules shift.

5 Case Study 3: The Most-Favored-Nation (MFN) and Injunctive Parity Tension

A highly complex operational risk in multilateral regulatory agreements is the interaction between MFN clauses (which favor the defendant) and Parity clauses (which favor the regulator). The Meta Settlement contains both:

- **State Injunctive Parity (Section V.B):** If Meta enters into a settlement with another state with a lower Daily Limit, more restrictive Night Access Mode, or more restrictive School Hours, the Settling States automatically receive the benefit of that more restrictive term:
$$L_{Meta} \leq L_{other} \tag{13}$$
- **Meta Injunctive MFN (Section V.D):** If a Settling State reaches a settlement with any Core Industry Member (Snap, TikTok, YouTube) on terms more favorable to that member than the terms of this Agreement, the Settling State must modify Meta's terms so Meta obtains a term at least as relatively favorable.

5.1 Circular Scenario & Feedback Loop

Let us model a plausible multi-party regulatory scenario:

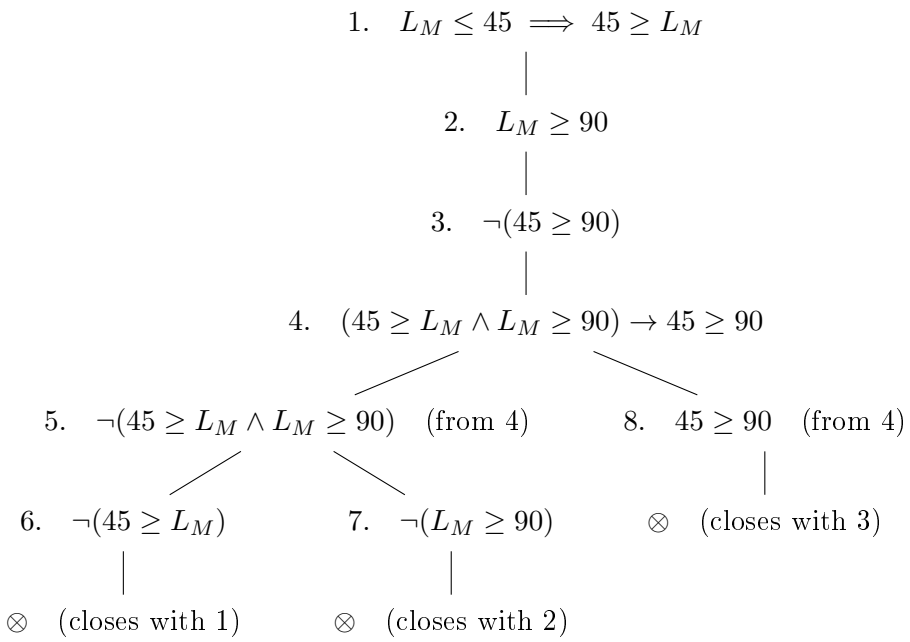
1. Let L_M represent Meta's default daily limit in Settling State S_1.
2. Suppose Meta subsequently settles with a non-participating state S_2 for a more restrictive default limit of 45 minutes: $L_{other} = 45$.
3. Under Section V.B (Injunctive Parity), this triggers an automatic reduction of Meta's limit in S_1 to 45 minutes:
$$L_M \leq 45 \tag{14}$$
4. Simultaneously, Settling State S_1 reaches a settlement with TikTok (a Core Industry Member) establishing a daily limit of 90 minutes ($L_T = 90$).
5. A daily limit of 90 minutes is more permissive, and thus "more favorable" to the platform, than Meta's 60-minute or 45-minute limit.
6. This activates Meta's Injunctive MFN (Section V.D). Meta demands that its limit in S_1 be relaxed to match TikTok's 90-minute limit to ensure equal competitive footing:
$$L_M \geq 90 \tag{15}$$
7. Finally, we assume the mathematical transitivity of order and the fact that 45 is strictly less than 90 ($45 < 90$).

We test the consistency of this final state, represented by the set of formulas:

$$\mathcal{S}_3 = \{L_M \leq 45,\ L_M \geq 90,\ \forall x \forall y \forall z((x \leq y \wedge y \geq z) \rightarrow x \geq z),\ \neg(45 \geq 90)\} \tag{16}$$

Note that the third formula is the standard transitivity of the ordering relation (since $45 \geq L_M \wedge L_M \geq 90 \rightarrow 45 \geq 90$).

5.2 Tableau Construction



5.3 Legal-Logical Conclusion

Because all branches close, the set of clauses $\mathcal{S}_3$ is **logically inconsistent**.

This represents a classic **regulatory deadlock** or **circular feedback loop**. Under the current contract drafting, if Meta triggers Injunctive Parity by settling with another state for a stricter term, and a competitor subsequently triggers the Meta MFN by securing a more relaxed term, the state of the law in State S_1 becomes logically impossible. Meta is simultaneously required by Section V.B to restrict access further (≤ 45 minutes) and permitted by Section V.D to expand access (≥ 90 minutes).

This logical inconsistency is not merely a theoretical defect; it creates an immediate operational compliance failure. Because the agreement permits a Settling State to take immediate legal action to enforce compliance if they believe a threat to public health requires it (Section VIII.C), Meta could face litigation in State S_1 for failing to enforce the 45-minute default, while simultaneously possessing an enforceable contractual right under Section V.D to maintain a 90-minute default.

6 Implications for Legal Engineering and Contract Drafting

The logical deadlocks and temporal decoupling analyzed above demonstrate that modern multilateral consent decrees have reached a level of complexity where conventional, intuitive contract drafting is no longer sufficient. To prevent operational compliance failures and circular feedback loops, legal draftspersons should adopt the principles of **legal engineering**—the formal modeling and testing of contractual clauses prior to execution.

We propose two concrete drafting remedies to resolve the MFN-Parity inconsistency identified in Case Study 3:

6.1 Drafting Remedy A: Explicit Hierarchy of Clauses

To resolve the contradiction, the contract must define which clause takes precedence in the event of an overlap. We recommend inserting a priority rule in Section V:

> *"Section V.E. Hierarchy of Parity and MFN Terms. In the event of any conflict, inconsistency, or overlap between the operation of the State Injunctive Parity provisions (Section V.B) and the Meta Injunctive MFN provisions (Section V.D), the more restrictive time-management setting shall prevail. Specifically, Meta's default limits shall in no event exceed the maximum restrictive limits established under Section V.B, notwithstanding any more favorable terms obtained by Core Industry Members under Section V.D."*

Under this amended drafting, the MFN claim would be blocked, and the tableau would remain open and consistent at $L_M \leq 45$.

6.2 Drafting Remedy B: Bilateral Adjustment Carve-outs

Alternatively, to preserve Meta's competitive parity, the contract can establish an automatic carve-out that suspends Parity obligations during MFN adjustments:

> *"Section V.E. MFN Carve-out. The automatic operation of Section V.B shall be temporarily suspended with respect to a specific Injunctive Provision in a Settling State if Meta has initiated the dispute resolution process or submitted a written MFN modification request under Section V.D regarding a substantively equivalent term, pending final resolution of the modification under Section VIII."*

This suspends the $L_M \leq 45$ requirement, allowing Meta to transition cleanly to the MFN-mandated limit without triggering a contractual breach.

7 Conclusion

This formal logical-legal analysis of the Meta Platforms State Attorneys General Settlement Agreement demonstrates both the power of modern regulatory drafting and its inherent risks. Using the semantic tableau method, we have formally proven that:

1. The contract's monetary-injunctive payment trigger is successfully decoupled, allowing Meta to operationally revert to Phase I during industry non-compliance while ensuring the \$5.02 Billion in contingency payments remain legally secured for the States.
2. Meta's U13 Age Model commitment is protected by mathematically complete regulatory escape hatches tied to federal COPPA compliance and FTC policy stability.
3. The simultaneous application of Injunctive Parity and Meta MFN provisions creates an operational deadlock (logical inconsistency) under plausible competitive settlement scenarios.

By integrating formal logic and automated testing into the drafting of complex settlements, regulatory bodies and corporate counsel can eliminate compliance contradictions, mitigate litigation risk, and build more robust, stable legal frameworks.