

# Client Alert

## A recap on MiCAR white paper machine readability requirements

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## Financial Services

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**QuickTake**

The EU's Markets in Crypto-Assets Regulation (EU) 2023/1114, commonly known as **MiCAR**, introduced a comprehensive framework for the regulation of crypto-assets across the EU, including detailed requirements for the publication of crypto-asset white papers. A key element of this framework is the requirement that white papers be made available in a machine-readable format, which is intended to facilitate supervisory oversight, data aggregation and comparability across the single market. This Client Alert summarises those obligations.

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**A recap on the white paper obligation**

Under MiCAR, issuers of crypto-assets (other than those exempted, such as certain utility tokens offered free of charge or to fewer than 150 persons per Member State) are required to draw up, notify to the relevant national competent authority (**NCA**) and publish a crypto-asset white paper before offering the crypto-asset to the public or seeking its admission to trading on a platform.

To be more specific, any entity (including third country issuers<sup>1</sup>) issuing, offering or providing services related to crypto-assets to clients within the EU, regardless of where that entity is located or registered, must comply with MiCAR requirements. This means that the white paper obligation is triggered whenever a crypto-asset is offered to the public within the EU or admitted to trading on an EU trading platform. MiCAR adopts a home Member State supervisory model under which all white paper notifications for crypto-assets other than asset-referenced tokens (**ART**) or e-money tokens (**EMT**) must be made exclusively to the NCA of the issuer's home Member State or person seeking admission in a respective Member State. At the time of notification, the issuer or person seeking admission must also provide the home state NCA with a list of any host Member States in which the crypto-asset is intended to be offered to the public or admitted to trading, together with the intended starting date and any subsequent changes to that date.

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<sup>1</sup> Third-country issuers must comply with MiCAR, including the white paper obligation, and there is no equivalence regime permitting market access on the basis of home country rules alone. In practice, non-EU issuers face significant challenges, including difficulty identifying a home Member State, notifying a white paper to an NCA, or obtaining authorisation for ARTs and EMTs. While some issuers may seek to rely on reverse solicitation, this exemption is narrowly construed and cannot serve as a general route to market access; any pattern of marketing or promotion directed at EU investors is likely to bring the issuer within scope. Third-country issuers seeking systematic EU market access should consider establishing an EU entity or partnering with an EU-authorized CASP, supported by appropriate legal advice.

On 7 May 2024, the European Banking Authority (**EBA**) published three sets of final draft regulatory technical standards (**RTS**) and one set of final draft implementing technical standards (**ITS**), which set out the procedure for the approval of white papers for ARTs issued by credit institutions under the MiCAR. One of the most important requirements for the approval is that “the credit institution shall submit the crypto-asset white paper to the competent authority by electronic means and provide a contact point for the competent authority to submit all communications to it” (please refer to this previous Client Alert<sup>2</sup>). Besides, The EBA’s 2024 Final Report<sup>3</sup> particularly reinforces that legal persons authorised as credit institutions (i.e., banks) subject to the MiCAR obligation to publishing an ART white paper (please refer to this Client Alert<sup>4</sup>).

The aforementioned white paper obligation applies across the three principal categories of crypto-assets under MiCAR:

- Asset-referenced tokens (Title III, Articles 16–47)
- E-money tokens (Title IV, Articles 48–58)
- Other crypto-assets not falling within the above categories (Title II, Articles 4–15)

Annex I, II and III of the MiCAR outlines the mandatory disclosures for a crypto-asset white paper, specifically detailing the risks associated with the offeror, the crypto-asset, and the underlying technology.

At a minimum, the white paper must contain information about the issuer or offeror, including its legal name, registered address, and the identity and experience of its management body. It must set out a detailed description of the crypto-asset itself, covering its type, functionality, the rights and obligations attached to it, and the underlying technology and consensus mechanism employed. The white paper must also describe the project to be carried out with the capital raised, the business model, the intended use of proceeds, and the key milestones for the project. In respect of the offer, it must specify the total number of crypto-assets to be issued, the issue price or pricing methodology, and the subscription period and conditions. A comprehensive description of the risks associated with the issuer, the crypto-asset, the technology, and the project must be included, together with a clear warning that the holder could lose the full value of the investment. The white paper must further address the principal adverse impacts of the consensus mechanism on the climate and the environment. The content requirements differ somewhat depending on the category of crypto-asset, but the overarching principle is one of fair, clear and not misleading disclosure.

This Client Alert should be read in conjunction with further analysis on MiCAR generally as well as specifically in context of further RTS/ITS as available from PwC Legal’s dedicated EU Regulatory Compliance Operations, Risk and Engagement ([EU RegCORE](#)) centre.

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## Key takeaways

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### 1. The machine-readable requirement

Article 6(7) and Article 51(8) of MiCAR, among other provisions, empower the European Securities and Markets Authority (**ESMA**) — and, in the case of e-money tokens, the EBA — to develop regulatory technical standards (**RTS**) and implementing technical standards (**ITS**) specifying, amongst other things, the format and content of white papers, including their machine-readable elements.

The core legislative requirements can be summarised as follows:

- **Notification in machine-readable form:** When an issuer notifies a white paper to the relevant NCA, the white paper must be submitted in a machine-readable format. This is to enable NCAs to process, store and transmit the data efficiently and to facilitate the central register of white papers maintained by ESMA under Article 109 of MiCAR.
- **Publication in machine-readable form:** MiCAR requires that white papers be published on the issuer’s website in a machine-readable format, ensuring that the information is accessible and searchable not only by human readers but also by automated systems. This supports transparency and market integrity objectives.
- **ESMA Register:** Under Article 109, ESMA is required to maintain a register of all crypto-asset white papers notified to NCAs. The machine-readable format is essential for the functioning of this register, as it enables ESMA to aggregate and make available standardised data on a pan-EU basis.

### 2. Delegated and implementing legislation

ESMA and the EBA have been mandated to produce draft RTS and ITS further specifying the technical details of the machine-readable format. Key aspects addressed in these standards include:

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<sup>2</sup> Available [here](#).

<sup>3</sup> Available [here](#).

<sup>4</sup> Available [here](#).

- **Data fields and templates:** The standards prescribe specific data fields that must be completed in a structured, standardised manner — for example, the name and legal entity identifier (**LEI**) of the issuer, the type and classification of the crypto-asset, the consensus mechanism used and key dates.
- **File format:** The machine-readable format is expected to align with common data standards used in EU financial services regulation, drawing on precedents such as the European Single Electronic Format (**ESEF**) used under the Transparency Directive and inline XBRL. Specific requirements may mandate the use of formats such as XML, JSON or XHTML with embedded structured data, depending on the final technical standards adopted.
- **Interoperability and standardisation:** The objective is to ensure that white papers can be processed by a wide range of software tools without bespoke adaptation, facilitating cross-border supervision and reducing compliance costs for multi-jurisdictional issuers.
- **Updates and amendments:** Where an issuer is required to update or amend a white paper (for example, following a material change in circumstances), the updated version must also be submitted and published in the prescribed machine-readable format, with appropriate version control and dating.

### 3. Related legislative context

The machine-readable white paper requirement should be understood in the broader context of the EU's digital finance strategy, which includes parallel initiatives such as the Digital Operational Resilience Act (**DORA**), the (revised) DLT Pilot Regime Regulation and the EU's wider push towards supervisory technology (**SupTech**) and data-driven regulation. The emphasis on machine readability reflects the European Commission's commitment to enhancing the efficiency and effectiveness of financial supervision through technology, as articulated in its Digital Finance Strategy of September 2020.

### 4. Practical implications for Issuers

From a compliance perspective, the machine-readable requirement means that issuers cannot simply produce a PDF or narrative document and consider their obligations discharged. Instead, they must ensure that their white papers conform to the prescribed structured data standards. This has several practical consequences:

- Issuers will likely need to engage with specialist service providers or adopt dedicated compliance tools to generate white papers in the required format.
- Internal legal, compliance and technology teams must coordinate to ensure that all mandatory data fields are accurately populated and kept up to date.
- Issuers operating across multiple Member States benefit from the harmonised format, as a single machine-readable white paper can serve as the basis for notification to multiple NCAs.

### 5. Automated validation and supervisory expectations

MiCAR white paper disclosure is **not** a one-time exercise — it demands ongoing accuracy, consistency and auditability. Supervisory expectations focus on completeness, internal consistency, automated compliance validation and the demonstrable accuracy of disclosures submitted to competent authorities. Supervisors increasingly expect to see evidence of systematic, repeatable validation processes rather than ad hoc document assembly. This means that real-time, automated validation of white paper content against the full MiCAR ITS rulebook is becoming essential, with gaps, inconsistencies and non-compliant language flagged before submission to materially reduce regulatory risk and remediation cycles.

### 6. Liability and enforcement in the context of machine-readable disclosures

The machine-readable format requirement under MiCAR is not merely a technical specification - it has direct implications for the liability regime. Under Article 15, an issuer, offeror or person seeking admission to trading is liable to a holder of a crypto-asset for any loss attributable to an infringement of the disclosure requirements, including where the white paper contains information that is incomplete, unclear or misleading. Critically, the structured data fields mandated by the ITS must be accurately populated; errors or omissions in machine-readable disclosures - such as incorrect classification of the crypto-asset type, inaccurate consensus mechanism descriptions, or missing LEI data - may give rise to civil liability where they affect an investor's assessment of the crypto-asset. Automated validation tools can assist issuers in identifying and correcting such errors before notification, thereby reducing liability exposure.

From an enforcement perspective, NCAs have specific powers to address non-compliance with machine-readable format requirements. Under Article 111, NCAs may impose administrative sanctions for failure to submit or publish white papers in the prescribed format, including fines of up to EUR

5,000,000 or 3% of total annual turnover for legal persons. NCAs may also require amendments to a white paper where the machine-readable elements are incomplete or non-compliant, or suspend an offer until the technical deficiencies are remedied. ESMA's central register under Article 109 depends on the consistent application of machine-readable standards across all Member States, and NCAs are expected to take a rigorous approach to format compliance to ensure the register functions effectively.

## **7. Cross-border passporting and machine-readable interoperability**

The machine-readable white paper format is fundamental to the effective functioning of MiCAR's single passport regime. Once a white paper is notified to the home NCA in the prescribed machine-readable format, the home NCA must communicate it to host Member State NCAs and ESMA within five working days. The standardised data structure ensures that host NCAs can process the notification automatically without requiring manual review or reformatting. This interoperability means that issuers benefit from a single, harmonised submission that serves all Member States, eliminating the need for bespoke adaptations for different jurisdictions. Any subsequent amendments to the white paper must also be submitted in machine-readable format to maintain consistency across the ESMA register and ensure that all NCAs have access to identical, up-to-date structured data.

## **8. Language requirements and machine-readable translation considerations**

The intersection of MiCAR's language requirements and the machine-readable format obligation presents practical challenges for issuers conducting cross-border offerings. Under Article 6(4), the white paper must be drawn up in an official language of the home Member State (or in English), and must also be made available in the languages of any host Member States. From a machine-readability perspective, this means that the structured data fields - including narrative disclosures, risk warnings and technical descriptions - must be accurately translated and encoded in the prescribed format for each language version. ESMA's technical standards require that each language version submitted to NCAs or published on the issuer's website conform to the same machine-readable schema, ensuring that automated systems can process all versions consistently.

The plain language summary required under Article 6(6) must also be included within the machine-readable structure. Issuers should ensure that the summary data fields are populated with clear, non-technical language accessible to retail investors, while maintaining the structural integrity required for automated processing. Compliance tools that validate both the technical format and the linguistic accessibility of the summary can assist issuers in meeting these dual requirements.

## **9. Withdrawal rights and machine-readable disclosure requirements**

MiCAR introduces a 14-day withdrawal right for retail investors under Article 13, and this right must be disclosed in the white paper. From a machine-readability perspective, the ITS prescribes specific data fields for withdrawal-related disclosures, including the existence of the right, the conditions for its exercise, the procedure for notifying the issuer, and the timeframe for reimbursement. These fields must be accurately populated to enable automated supervisory review and to ensure that the ESMA register contains complete information on investor protection measures. Failure to include accurate withdrawal right disclosures in the structured data may constitute a material omission giving rise to liability under Article 15.

Issuers should note that withdrawal right disclosures in the machine-readable format must be kept up to date; any changes to the conditions or procedures for withdrawal (for example, following changes to applicable consumer protection law) should be reflected in an amended white paper submitted in the prescribed format.

## **10. Marketing communications and consistency with machine-readable white papers**

Article 7 of MiCAR requires that marketing communications be consistent with the information contained in the white paper and must not contradict or understate the risks disclosed therein. The machine-readable format facilitates this consistency requirement by enabling automated cross-referencing between marketing materials and the structured data in the white paper. Issuers should consider implementing compliance processes that extract key data points from the machine-readable white paper - such as the crypto-asset classification, consensus mechanism, risk factors and issuer details - and verify that all marketing communications accurately reflect this information. Such automated consistency checks reduce the risk of inadvertent discrepancies that could attract regulatory scrutiny or give rise to investor claims.

NCAs have the power to review marketing communications and to require amendments or cessation where they are inconsistent with the white paper. The availability of machine-readable white paper data enables NCAs to conduct more efficient supervisory reviews, as automated tools can flag potential inconsistencies between marketing claims and the disclosed structured data.

## **11. Third-country issuers and machine-readable format compliance**

Third-country issuers seeking to offer crypto-assets within the EU or to seek admission to trading on an EU platform must comply with MiCAR's machine-readable white paper requirements in full. There is no reduced or alternative format available for non-EU issuers, and the same ITS specifications apply

regardless of the issuer's jurisdiction of incorporation. This presents practical challenges, as third-country issuers may not have access to the same compliance infrastructure, validation tools or advisory support that EU-based issuers can draw upon. Non-EU issuers should ensure they engage advisers with specific expertise in MiCAR machine-readability requirements and consider using dedicated compliance platforms capable of generating white papers in the prescribed EU format.

From a supervisory perspective, NCAs and ESMA are likely to scrutinise white papers from third-country issuers closely, including verification that the machine-readable format complies fully with the applicable ITS. Any deficiencies in format compliance may delay notification, trigger requests for amendment, or result in enforcement action. Third-country issuers should factor additional time into their offering timetables to allow for format validation and any necessary corrections before notification to the NCA.

Third-country issuers that wish to access the EU market on a systematic basis should consider establishing an EU entity or partnering with an EU-authorized CASP, which may provide access to established machine-readable compliance workflows and validation tools. Careful structuring and specialist legal and technical advice are essential to ensure full compliance with MiCAR's format requirements from the outset.

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## Current status and outlook

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As of March 2026, MiCAR has been fully applicable since 30 December 2024 for all categories of crypto-assets. ESMA and the EBA have published final versions of several of the relevant RTS and ITS and NCAs across Member States are actively processing white paper notifications. Issuers and their advisers should ensure they are consulting the latest versions of the applicable technical standards, as well as any guidance published by their home NCA, to ensure full compliance with the machine-readable format requirements.

In summary, the machine-readable white paper requirement under MiCAR represents a significant step towards standardised, technology-enabled disclosure in the crypto-asset space and issuers must take a proactive and technically informed approach to compliance.

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## How PwC Legal's "MiCAR START" offering can help clients

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To address the compliance challenges outlined above, PwC Legal has developed "MiCAR START" (Submission, Traceability, Automation, Reporting & Transparency) — a joint PwC Legal –Auditchain Labs solution, powered by the Pacioli.ai platform — which delivers a proprietary, web3-enabled environment that transforms white paper preparation from a compliance burden into a streamlined, auditable and supervisory-ready process. The START offering provides clients with the following key capabilities:

- 1. Platform and Technology:** Each client receives access to a dedicated, secure instance of the START platform, purpose-built for MiCAR compliance and provisioned exclusively for the client's organisation. The platform enables collaborative white paper preparation between internal teams and external advisers, with full traceability, version control and role-based access. Intuitive, template-driven workflows guide users through the composition of compliant white papers for EMTs, ARTs and other crypto-assets, fully aligned with the MiCAR ITS. The platform performs real-time, automated validation of white paper content against the full MiCAR ITS rulebook and independent external technical validation is provided by the Pacioli.ai Validating Node, creating an additional layer of automated technical verification and a clear audit trail for supervisory purposes. Finalised white papers can be exported in iXBRL format for direct filing with regulators, as well as in .xls, .pdf and .html formats for internal review and publication.
- 2. PwC Legal, Regulatory and Advisory Support.** Beyond the technology platform, PwC Legal provides a comprehensive suite of legal and regulatory advisory services, including MiCAR strategy and readiness advice, regulatory interpretation and scoping guidance and strategic support to ensure that white papers reflect both supervisory expectations and market best practice. PwC's and PwC Legal's capital markets and regulatory specialists review draft white papers for accuracy, completeness, consistency and alignment with MiCAR disclosure principles, challenging assumptions and stress-testing risk disclosures. PwC and PwC Legal also support pre-filing engagement with competent authorities, preparation of supplementary materials and responses to supervisory queries.
- 3. Implementation, Training and Marketing Support.** Auditchain Labs provides comprehensive documentation, live training sessions and hands-on implementation support to ensure client teams are fully equipped to operate the platform effectively. The platform can be configured to reflect the client's branding, internal approval workflows and disclosure policies, with bespoke development services

available for additional features or integrations. For issuers seeking to communicate their MiCAR compliance credentials to investors and the market, Auditchain Labs also provides marketing materials and communications support.

For further information on the MiCAR START platform, please contact Dr. Michael Huertas (Partner, Global & European FS Legal Leader) at Michael.Huertas@pwc.com or Dr. Hagen Weiss (Digital Assets Legal Leader) at hagen.weiss@pwc.com.

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## About us

PwC Legal is assisting a number of financial services firms and market participants in forward planning for changes stemming from relevant related developments. We have assembled a multi-disciplinary and multijurisdictional team of sector experts to support clients navigate challenges and seize opportunities as well as to proactively engage with their market stakeholders and regulators.

Moreover, we have developed a number of RegTech and SupTech tools for supervised firms, including PwC Legal's Rule Scanner tool, backed by a trusted set of managed solutions from PwC Legal Business Solutions, allowing for horizon scanning and risk mapping of all legislative and regulatory developments as well as sanctions and fines from more than 2,500 legislative and regulatory policymakers and other industry voices in over 170 jurisdictions impacting financial services firms and their business.

Equally, in leveraging our Rule Scanner technology, we offer a further solution for clients to digitise financial services firms' relevant internal policies and procedures, create a comprehensive documentation inventory with an established documentation hierarchy and embedded glossary that has version control over a defined backward plus forward looking timeline to be able to ensure changes in one policy are carried through over to other policy and procedure documents, critical path dependencies are mapped and legislative and regulatory developments are flagged where these may require actions to be taken in such policies and procedures.

The PwC Legal Team behind Rule Scanner are proud recipients of ALM Law.com's coveted "2024 Disruptive Technology of the Year Award" and the "2025 Regulatory, Governance and Compliance Technology Award in 2025".

If you would like to discuss any of the developments mentioned above, or how they may affect your business more generally, please contact any of our key contacts or PwC Legal's RegCORE Team via [de\\_regcore@pwc.com](mailto:de_regcore@pwc.com) or our website.

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