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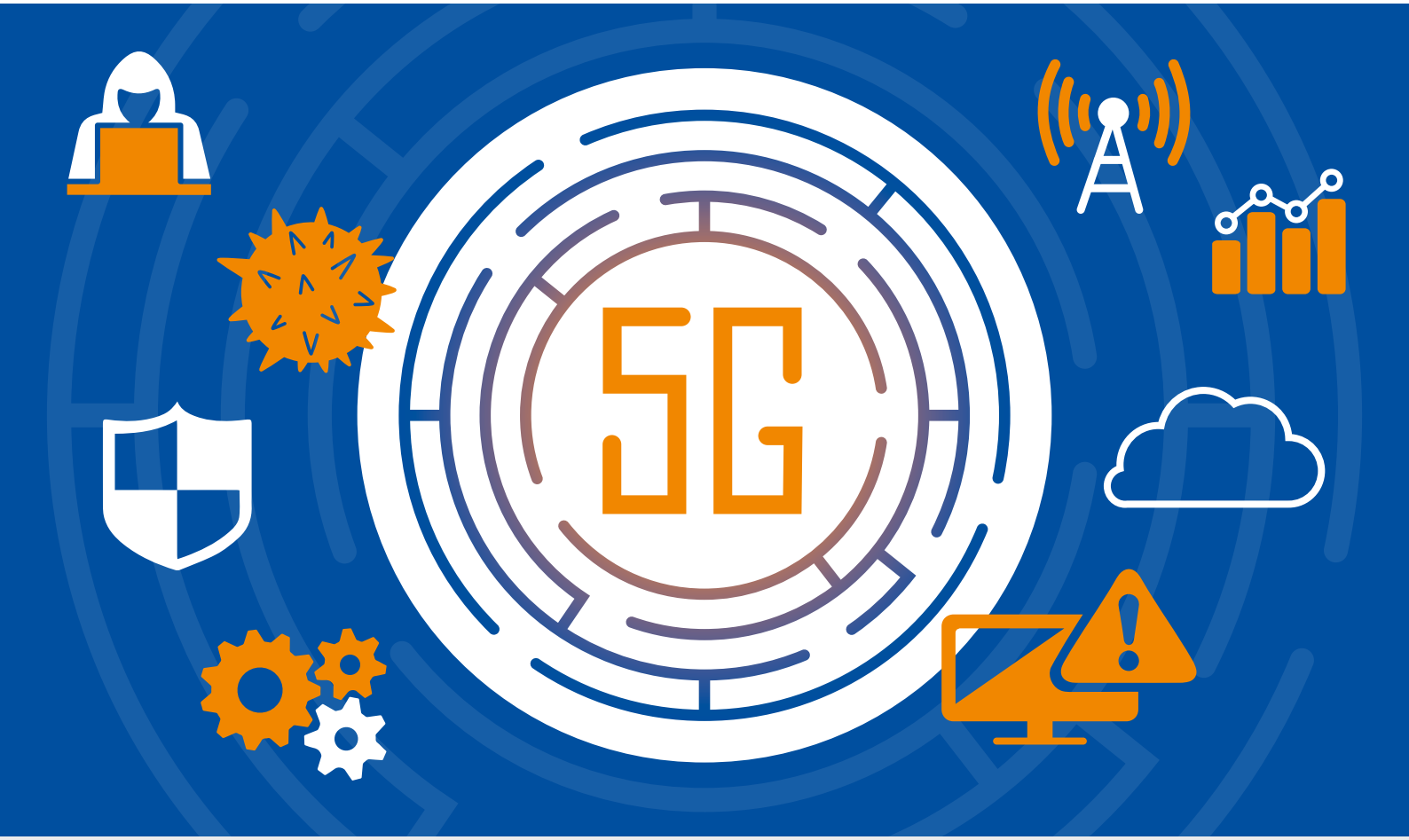
FOR CYBERSECURITY



5G Security Controls Matrix

The EU Cybersecurity strategy requires the European Union Agency for Cybersecurity (ENISA) *to develop a comprehensive and dynamic matrix of security controls and best practices for 5G security*. The ENISA 5G security controls matrix was developed in 2021 and 2022 in close collaboration with national authorities in the EU Member States and in consultation with industry experts working in the EU telecom sector.

The main goal of the ENISA 5G security controls matrix is to support the national authorities in the EU Member States with implementing the technical measures of the EU's 5G Cybersecurity toolbox. The ENISA 5G security controls matrix follows the overall structure of the ENISA Guideline for Security measures under the EECC, the European Electronic Communications Code. It consolidates 4 ENISA deliverables (the ENISA 5G threat landscape, the ENISA guideline on Security Measures under the EECC, its 5G supplement, and the ENISA paper on security controls in 5G technical specifications), and it provides a list of high-level security objectives, but also more detailed technical and non-technical controls, which are relevant for the security of 5G networks.

This document is a short factsheet to explain what is in the ENISA 5G security controls matrix and how it can be used in practice.

OUR GOAL: CONSOLIDATING 5G SECURITY CONTROLS IN A SINGLE REPOSITORY

The ENISA 5G Security Controls Matrix includes controls specific to 5G networks and functions...

For instance, 3GPP Technical Specification 33.501, as well as ETSI standards for component technologies, such as virtualisation.

...as well as more general ones

Mostly of a non-technical character, including:

The ENISA 5G Security Controls Matrix maps various technical controls to an established EU supervisory framework for telecoms

In 2014, experts from European competent authorities established an EU framework for telecom security measures to support national authorities with the supervision of providers of electronic communications. It has since been updated and is now referred to as the Guideline on Security Measures under the EECC.

The purpose of the 5G Matrix is to provide one repository of detailed technical controls mapped to the objectives and measures of the EECC Guideline. The repository is used as a tool by national authorities in their supervision of measures taken by operators to secure their 5G networks.

The 5G Matrix also has additional features

The additional features of the 5G Matrix include verification methods, a mapping to assets, references to specific sections in standards, as well as categorisation based on the cloud deployment model and its relevance to standalone or non-standalone 5G networks.

The 5G Matrix will assist competent authorities, telecom companies and other stakeholders

We made earlier versions of the Matrix available to authorities from 2021 and we have been gathering feedback on the potential use cases of the Matrix since then. We also ran a pilot programme with authorities in 2022 to understand how they would use it. We learned that different national authorities use the Matrix in different ways, either directly in their supervision or as input for national policies and security frameworks.

EU telecom operators have also shown interest in using the 5G Matrix because it helps them to map their security measur es to the high-level security requirements of their national authorities as imposed under the European Electronic Communications Code (EECC).

WHAT IS IN THE SPREADSHEET AND HOW TO USE IT IN PRACTICE?

The spreadsheet has several tabs which contain the raw data

The different tabs list the main elements of the EECC Guideline, such as the 8 security domains, the 29 security objectives, the 144 security measures and the 171 descriptions of evidence. In addition, there is a tab with 110 asset types and a tab with the standards and specifications used in the Matrix.

Detailed technical controls are all listed in the '5G Controls' tab

Each 5G control in the Matrix comes with its own specific 'evidence', i.e. a verification method. Technical controls, for example, are accompanied by a description of a test and the desired outcome.

Each 5G control in the Matrix also comes with a mapping to different types of assets, as well as references to specific sections in various standards for further information.

Technical controls are marked to show their relevance for standalone or non-standalone 5G networks and a particular cloud deployment model.

There are three alternative data presentation tabs (matrices): A, B and C

National authorities and operators are using the 5G Matrix in different ways. To cater to their different needs, we developed three different visualisations of the same set of technical controls:
Matrix A follows the structure of the 29 high-level objectives in the EECC guideline. In Matrix A the detailed technical controls extend horizontally.
Matrix B follows the technical security measures in the EECC guideline and the technical controls in the 5G Matrix. In this visualisation, technical controls extend vertically in a flat structure, using colours to differentiate them. Column G provides a mapping between them.
Matrix C is a variation of Matrix B. While it is still built around EECC Guideline security measures and detailed Matrix controls, they are no longer listed in a flat table. Instead, all detailed controls are placed underneath their corresponding EECC Guideline measures, visually demonstrating the parent-child relationship.

There are two 'legacy' tabs for 5G Matrix pilot participants

The tab 'ControlMapping' maps old control IDs, which were used in the pilot version of the Matrix, to the new numbering of the controls. The tab 'checks' explains how the 5G checks, a separate list present in earlier versions of the Matrix, were integrated into the detailed technical controls.

WHAT IS NEXT FOR THE ENISA 5G CONTROLS MATRIX

We are refining the 5G Matrix and will create a web tool in 2023

In 2023, we are refining the Matrix based on additional feedback received in 2022 and we are turning the Matrix into a webtool. Our goal is a layout capturing all the data in a clear way and an implementation that is in a more user-friendly format, allowing for filtering (e.g. against specific assets).

We will keep refining, extending and updating the technical controls

In 2023, we are extending the Matrix with more detailed non-technical controls relating, for example, to risk management processes, HR security, supplier information security risk management, access control policies, incident and business continuity management.

This extension is primarily based on ISO/IEC 27002, ISO/IEC 27005, ISO 22301 and NIST SP 800-53.

Work with us!

Feel free to send us comments and feedback. We take all feedback into account and strive to respond to you in detail.

Important improvements of the 5G Matrix, such as the tagging of controls to indicate relevance for standalone or non-standalone 5G networks, were triggered by stakeholder feedback. Several technical controls have been amended following detailed feedback from stakeholders.

Please send your feedback to
ENISA-NIS-Directive@enisa.europa.eu

ACKNOWLEDGEMENTS

To prepare the Matrix, we worked closely with experts from national authorities within the European Competent Authorities for Secure Electronic Communications (ECASEC) Expert Group (formerly known as the Article 13a Expert Group), as well as the experts contributing to the NIS CG work stream on 5G cybersecurity. We are grateful for their valuable feedback.

We are also very grateful for feedback received from telecom operators, which allowed us to make further improvements to the Matrix.

ANNEX – FREQUENTLY ASKED QUESTIONS

Where do the technical controls in the 5G Matrix come from?

The high-level objectives and some of the technical measures are taken from the ENISA Guideline on Security Measures under the EECC, which is used by EU Member States for the supervision of cybersecurity in the EU's telecom sector.

Additional technical controls have been taken from the 5G supplement, which extends the EECC security measures guideline, and the ENISA 5G Threat Landscape.

Additional technical controls have also been taken from the ENISA paper on Security Controls in 5G Specifications, a subsequent analysis of technical specifications (e.g. 3GPP), and other standards. The 5G Matrix provides a full list of references and mappings for each technical control.

Did you validate the contents of the 5G Matrix with the sector?

In 2021, we worked with national authorities to develop the Matrix. In 2022 we shared a first version of the Matrix with the authorities, and we conducted a pilot programme to test how authorities would use it.
In 2023, we conducted an industry consultation by asking the national telecom authorities to share a near-final version of the Matrix with their operators. In this industry consultation we received and implemented detailed comments from experts working in the sector.

What is the difference compared to the EU certification scheme for 5G, aka EU5G

Under the EU telecom framework, the EECC, and now under the NIS2, EU Member States supervise telecom operators in their country to ensure that they take appropriate security measures to secure their networks. This oversight role is often referred to as 'supervision'. Supervision by national authorities focuses on the national telecom operators offering network access to subscribers. The 5G controls Matrix is a tool to support the national authorities in their supervisory tasks.

The goal of the EU cybersecurity certification schemes is to improve the security of products on the EU market. It focuses on the suppliers and vendors. Under the EU certification framework, the European Commission has asked ENISA to develop candidate schemes for Common Criteria (EUCC), for cloud services (EUCS) and for 5G (EU5G). The 5G scheme in particular aims to provide a certification scheme for suppliers of 5G network products which they are selling to the telecom operators. 5G certification would help operators with securing their networks because the products they buy would have been assessed upfront. It would also provide elements of security in EUICC platforms used for eSIMs.

Are the controls in the ENISA 5G Security Control Matrix the same as those in the EU 5G cybersecurity certification scheme, aka EU5G?

Yes, the technical controls in the Matrix and the controls in the EU5G scheme are aligned. They are both based on the same 3GPP/ETSI 5G specifications. The set of controls in the ENISA 5G Security Controls Matrix however is broader, because it addresses the security of 5G networks run by the telecom operators. The EU5G scheme focuses specifically on 5G network products and the eUICC platform.

At the time of writing, the candidate EU5G scheme is still being drafted. ENISA will continue to update the Matrix and align it with the controls in the EU5G scheme where needed.