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Assurance report of the independent IT auditor

To: management of KPN B.V.

Our opinion

KPN provides Certification Authority services. We have examined the suitability of the design and operating effectiveness of the controls to achieve the related Control Objectives (hereinafter: the Criteria) for these services, as stated in WebTrust Principles and Criteria for Certification Authorities v2.2, for KPN's Certification Authority (CA) services at Apeldoorn for Subordinate CAs as referenced in Appendix A, throughout the period from 25 May 2019 to 24 May 2020.

In our opinion, in all material respects, KPN has throughout the period from 25 May 2019 to 24 May 2020:

- Disclosed its business, key lifecycle management, certificate lifecycle management, and CA environmental control practices in its:
  - KPN Certification Practice Statement Symantec Trust Network, 4.2 April 8th, 2020 (see appendix B for published versions during audit period)
- Maintained effective controls to provide reasonable assurance that:
  - KPN's Certification Practice Statement is(are) consistent with the STN Certificate Policy (see appendix B for published versions during audit period)
  - KPN provides its services in accordance with its Certification Practice Statement
- Maintained effective controls to provide reasonable assurance that:
  - The integrity of keys and certificates it manages is established and protected throughout their lifecycles
  - The integrity of subscriber keys and certificates it manages is established and protected throughout their lifecycles
- Maintained effective controls to provide reasonable assurance that:
  - Logical and physical access to CA systems and data is restricted to authorized individuals
  - The continuity of key and certificate management operations is maintained
  - CA systems development, maintenance, and operations are properly authorized and performed to maintain CA systems integrity

in accordance with the Criteria in WebTrust Principles and Criteria for Certification Authorities v2.2.

Our opinion has been formed on the basis of the matters outlined in this assurance report.

Basis for our opinion

We performed our examination in accordance with Dutch law and Guideline 3000A "Assurance-opdrachten door IT Auditors (attest-opdrachten)' (Assurance engagements performed by IT Auditors (attestation engagements)) as issued by the professional association for IT-auditors in the Netherlands (NOREA) and in accordance with International Standard on Assurance Engagements 3000, "Assurance Engagements Other than Audits or Reviews of Historical Financial Information". This engagement is aimed to obtain reasonable assurance. Our responsibilities in this regard are further described in the 'Our responsibilities for the examination' section of our assurance report.

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We have complied with the NOREA ‘Reglement Gedragscode’ (Code of Ethics for IT-Auditors, a regulation with respect to integrity, objectivity, professional competence and due care, confidentiality and professional behavior) and with the ‘Verordening inzake de onafhankelijkheid van accountants bij assurance-opdrachten’ (ViO, Code of Ethics for Professional Accountants, a regulation with respect to independence)]. The Code of Ethics for IT-Auditors and the NOREA Guidelines related to assurance engagements are at least as demanding as the International Code of Ethics for Professional Accountants (including International Independence Standards) of the International Ethics Standards Board for Accountants (the IESBA Code).

We believe that the assurance evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Matters related to the scope of our examination

External registration authorities

KPN makes use of external registration authorities for specific subscriber registration activities as disclosed in KPN’s business practices. Our procedures did not extend to the controls exercised by these external registration authorities.

Escrow, subscriber key generation services and certificate suspension, renewal and rekey services

KPN does not escrow its CA keys, does not provide subscriber key generation services, and does not provide certificate suspension, renewal and rekey services. Accordingly, our procedures did not extend to controls that would address those criteria.

Cybersecurity

Our examination was not conducted for the purpose of evaluating KPN’s cybersecurity risk management program. Accordingly, we do not express an opinion or any other form of assurance on its cybersecurity risk management program.

Subscribers and related parties

The relative effectiveness and significance of specific controls at KPN and their effect on assessments of control risk for subscribers and relying parties are dependent on their interaction with the controls, and other factors present at individual subscriber and relying party locations. We have performed no procedures to evaluate the effectiveness of controls at individual subscriber and relying party locations.

Other information in management assertion

We note that KPN refers in its management assertion to a matter that was disclosed by DigiCert on Mozilla’s Bugzilla platform. This matter was not examined by EY.

Our opinion is not modified in respect of these matters.

Inherent limitations

This assurance report does not include any representation as to the quality of KPN’s CA services beyond those covered by the Trust Services Principles and Criteria for Certification Authorities Version 2.2 criteria, or the suitability of any of KPN’s services for any customer's intended purpose.

There are inherent limitations in the effectiveness of any system of internal control, including the possibility of human error and the circumvention of controls. Because of inherent limitations in its internal control, KPN may achieve reasonable, but not absolute assurance that all security events are prevented and, for those controls may provide reasonable, but not absolute assurance that its commitments and system requirements are achieved. Controls may not prevent or detect and correct, error, fraud, unauthorized access to systems and information, or failure to comply with internal and external policies or requirements.

Examples of inherent limitations of internal controls related to security include (a) vulnerabilities in information technology components as a result of design by their manufacturer or developer; (b) breakdown of internal control at a vendor or business partner; and (c) persistent attackers with the resources to use advanced technical means and sophisticated social engineering techniques specifically targeting the entity. Furthermore, the projection of any evaluations of effectiveness to future periods is subject to the risk that controls may become inadequate because of changes in conditions, that the degree of compliance with such controls may deteriorate, or that changes made to the system or controls, or the failure to make needed changes to the system or controls, may alter the validity of such evaluations.

Restriction on use

Our assurance report including the appendices, is intended solely for the information and use of KPN and users of KPN's Certification Authority (CA) services at Apeldoorn for Subordinate CAs as referenced in Appendix A. Our assurance report including the appendices should only be used for the intended purpose by the intended users.

Responsibilities of management

KPN's management is responsible for the attached assertion and the provision of its described services in accordance with the WebTrust Principles and Criteria for Certification Authorities v2.2. Management is also responsible for identifying the risks that threaten the achievement of the Criteria and designing, implementing, and documenting controls that are suitably designed and operating effectively to achieve the related Criteria.

Furthermore, management is responsible for monitoring of controls to assess their effectiveness, without material deviations due to fraud or error, to identify deficiencies and to take corrective actions.

Our responsibilities for the examination

Our responsibility is to plan and perform our examination in a manner that allows us to obtain sufficient and appropriate assurance evidence for our opinion.

Our examination has been performed with a high, but not absolute, level of assurance, which means we may not have detected all material errors and fraud during our examination.

We apply the Reglement Kwaliteitsbeheersing NOREA (RKBN, a standard on quality control) that is at least as demanding as the International Standard on Quality Control 1 (ISQC 1), and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Our examination included among others:

- Obtaining an understanding of KPN's key and certificate life cycle management business practices, policies, processes and controls, and its suitability of the design and implementation of the controls intended to achieve the Criteria throughout the period from 25 May 2019 to 24 May 2020 and examining evidence supporting management's assertion and performing such other procedures over key and certificate integrity, over the authenticity and confidentiality of subscriber and relying party information, over the continuity of key and certificate life cycle management operations, and over the development, maintenance and operation of systems integrity as we considered necessary in the circumstances in order to obtain assurance evidence that is sufficient and appropriate to provide a basis for our opinion
- Selectively testing transactions executed in accordance with disclosed key and certificate life cycle management business practices
- Testing and evaluating the operating effectiveness of the controls
- Performing such other procedures as we considered necessary in the circumstances

Amsterdam, 18 August 2020

Ernst & Young Accountants LLP

signed by Peter Kornelisse

Appendix A – List of subordinate CAs in scope

CA Owner/ Certificate Name	Certificate Serial Number	SHA256 Fingerprint
ABN AMRO CA - G2	411A8F246F9499C1B5A4F35AED3EA311	B91AF4B7FFC8DB435304212030724BECB2F23686552149FD671339C9528A65F9
ABN AMRO CA - G2	13DFD759C63ADEE0C0776BCA9193B844	4CD77909EC1CF5B03DFE1EF6310F298689EF18C7EF678D5C207767331938BA9A
ABN AMRO Test CA - G2	2D1201300A83FA74E8C871766BED453B	52D90CEF761E2458A8B51638EF0A0513584EBA986E740C573AD2A73882818EE9
ABN AMRO Test CA - G2	32056153A6AC2A54C42F24BE1AACFB81	783425C5FF58BF45F267C5B68193E38138229B4135A943818AA34A187C6CE65F
Shell Information Technology International CA - G3	57B6E0B91CED71D26C3389D2336F1566	91603DADB54CBCDEDD43805EA7A272EB31DF8444775064A01821C2B650890DCE

Appendix B – Certificate Policy and Certificate Practice Statement versions in-scope

Policy Name	Version	Date
DigiCert Certificate Policy (CP) for Symantec Trust Network (STN)	2.12	June 25, 2019
DigiCert Certificate Policy (CP) for Symantec Trust Network (STN)	2.11	April 18, 2019
KPN DigiCert Trust Network Certification Practice Statement	4.2	April 8, 2020
KPN DigiCert Trust Network Certification Practice Statement	4.1	April 1, 2020
KPN Certification Practice Statement Symantec Trust Network	4.0	October 30, 2019
KPN Certification Practice Statement Symantec Trust Network	3.7	May 10, 2019

Appendix C – KPN's management assertion

KPN B.V. Management's Assertion

This Management Assertion regarding the Effectiveness of Controls over the CAs that are hosted on a system that is licensed to KPN B.V. (hereafter: KPN) by DigiCert is based on the WebTrust Principles and Criteria for Certification Authorities v2.2.

The management of KPN is responsible for operating a Certification Authority (CA) at Apeldoorn, Fauststraat 1, NL 7323 BA, The Netherlands for the Subordinate CA(s) listed in appendix A.

KPN's CA services provide the following certification authority services:

- Certificate Generation Service;
- Dissemination Service;
- Revocation Status Service.

The management of KPN is responsible for establishing and maintaining effective controls over its CA operations, including its CA business practices disclosure on its website (https://certificaat.kpn.com/support/downloads/repository/), CA business practices management, CA environmental controls, CA key lifecycle management controls, subscriber key lifecycle management controls, certificate lifecycle management controls, and subordinate CA certificate lifecycle management controls. These controls contain monitoring mechanisms, and actions are taken to correct deficiencies identified.

Controls have inherent limitations, including the possibility of human error and the circumvention or overriding of controls. Accordingly, even effective controls can provide only reasonable assurance with respect to KPN's CA operations. Furthermore, because of changes in conditions, the effectiveness of controls may vary over time.

Management of KPN has assessed the disclosure of its certificate practices and its controls over its CA operations. Based on that assessment, in KPN Management's opinion, in providing its CA services for the Subordinate CA(s) listed in appendix A at Apeldoorn, Fauststraat 1, NL 7323 BA, The Netherlands locations during the period from 25 May 2019 through 24 May 2020, KPN has:

- Disclosed its Business, Key Life Cycle Management, and Certificate Life Cycle Management, and CA Environmental Control practices in the applicable versions of KPN's DigiCert Trust Network Certification Practice Statement enumerated in Appendix B

- Maintained effective controls to provide reasonable assurance that:
  - KPN-CA's Certification Practice Statement(s) is(are) consistent with the DigiCert Certificate Policy(ies)
  - KPN-CA provides its services in accordance with its actual KPN Certification Practice Statement(s)

- Maintained effective controls to provide reasonable assurance that:
  - The integrity of keys and certificates it manages was established and protected throughout their life cycles;
  - The integrity of subscriber keys and certificates it manages was established and protected throughout their life cycles;
  - The Subscriber information was properly authenticated (for the registration activities performed by KPN); and
  - Subordinate CA certificate requests were accurate, authenticated and approved

- Maintained effective controls to provide reasonable assurance that:
  - Logical and physical access to CA systems and data was restricted to authorized individuals;
  - The continuity of key and certificate management operations was maintained; and
  - CA systems development, maintenance and operations were properly authorized and performed to maintain CA systems integrity

based on the *WebTrust Principles and Criteria for Certification Authorities v2.2*, including the following:

CA Business Practices Disclosure

- Certification Practice Statement (CPS)

CA Business Practices Management

- Certification Practice Statement Management
- CP and CPS Consistency

CA Environmental Controls

- Security Management
- Asset Classification and Management
- Personnel Security
- Physical & Environmental Security
- Operations Management
- System Access Management
- System Development and Maintenance
- Disaster Recovery, Backups, and Business Continuity Management
- Monitoring and Compliance
- Audit Logging

CA Key Lifecycle Management Controls

- CA Key Generation
- CA Key Storage, Backup, and Recovery
- CA Key Usage
- CA Key Archival
- CA Key Destruction
- CA Key Compromise
- CA Cryptographic Hardware Lifecycle Management

Certificate Lifecycle Management Controls

- Subscriber Registration
- Certificate Issuance
- Certificate Distribution
- Certificate Validation
- Certificate Revocation

Subordinate CA Certificate Lifecycle Management Controls

- Subordinate CA Certificate Lifecycle Management

After the audit period and before the issuing of the Webtrust report by the independent accountant, the following matter was disclosed by DigiCert on Mozilla's Bugzilla platform:

Mozilla Bug #	Description	Date Opened	Date closed
Bug 1649951	DigiCert: Incorrect OCSP Delegated Responder Certificate	2-July 2020	-

M. Valk
Director Identity Operations
KPN Security

Apeldoorn, August 18, 2020

Signature: ……………………..

Mathijs Hendrik Valk

Digitally signed by Mathijs Hendrik Valk
Date: 2020.08.18 14:13:48 +02'00'

Appendix A – List of Subordinate CAs in scope

SubCA	crt.sh ID	Certificate Serial Number	SHA256 Fingerprint
ABN AMRO CA - G2	319549071	411A8F246F9499C1B5A4F35AED3EA311	B91AF4B7FFC8DB435304212030724BECB2F23686552149FD671339C9528A65F9
ABN AMRO CA - G2	433215027	13DFD759C63ADEE0C0776BCA9193B844	4CD77909EC1CF5B03DFE1EF6310F298689EF18C7EF678D5C207767331938BA9A
ABN AMRO Test CA - G2	319549063	2D1201300A83FA74E8C871766BED453B	52D90CEF761E2458A8B51638EF0A0513584EBA986E740C573AD2A73882818EE9
ABN AMRO Test CA - G2	433215032	32056153A6AC2A54C42F24BE1AACFB81	783425C5FF58BF45F267C5B68193E38138229B4135A943818AA34A187C6CE65F
Shell Information Technology International CA - G3	319549067	57B6E0B91CED71D26C3389D2336F1566	91603DADB54CBCDEDD43805EA7A272EB31DF8444775064A01821C2B650890DCE

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