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INDEPENDENT ASSURANCE REPORT

To the management of Verizon Terremark NV ("Verizon Terremark")

Scope

We have been engaged, in a reasonable assurance engagement, to report on Verizon Terremark management's assertion that, except for matters described in the assertion, for its Certification Authority (CA) operations at Culliganlaan 2E, Diegem (Belgium), throughout the period May 1, 2017 through April 30, 2018 for its CAs as enumerated in Appendix B, Verizon Terremark has:

- ▶ Disclosed its business, key lifecycle management, certificate lifecycle management, and CA environmental control practices in the applicable versions of the Certificate Practice Statement and Certificate Policy, as stipulated in Appendix A

- ▶ Maintained effective controls to provide reasonable assurance that:
    - ▶ Verizon Terremark's Certification Practice Statement(s) are consistent with its Certificate Policies as enumerated in Appendix A.
    - ▶ Verizon Terremark provides its services in accordance with its Certificate Policies and Certification Practice Statements as enumerated in Appendix A.

- ▶ 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;
    - ▶ subscriber information is properly authenticated (for the registration activities performed by Verizon Terremark); and
    - ▶ subordinate CA certificate requests are accurate, authenticated, and approved

- ▶ Maintained effective controls to provide reasonable assurance that:
    - ▶ logical and physical access to CA systems and data is restricted to authorised individuals;
    - ▶ the continuity of key and certificate management operations is Maintained; and
    - ▶ CA systems development, maintenance, and operations are properly authorised and performed to maintain CA systems integrity

in accordance with the Trust Services Principles and Criteria for Certification Authorities v2.0.

Verizon Akamai SureServer CA G14-SHA1 (Appendix B, CA #1) ,Verizon Akamai SureServer CA G14-SHA2 (Appendix B, CA #2) ,Verizon Public SureServer CA G14-SHA1 (Appendix B, CA #3) ,Cybertrust Public SureServer SV CA (Appendix B, CA #5) ,Verizon Global Issuing CA (Appendix B, CA #6) ,Cybertrust SureServer EV OCSP CA (Appendix B, CA #8) ,Verizon Public SureServer EV SSL CA G14-SHA1 (Appendix B, CA #9) ,Cybertrust Public SureServer EV CA (Appendix B, CA #10) ,Cybertrust SureServer EV CA (Appendix B, CA #11) ,Cybertrust Public SureCredential CA (Appendix B, CA #12) ,Verizon Public SureCredential CA G14-SHA1 (Appendix B, CA #13) ,Verizon Public SureCodeSign CA G14-SHA1 (Appendix B, CA #16) ,Cybertrust Public SureCodeSign CA (Appendix B, CA #17) did not issue certificates during the period May 1, 2017 through April 30, 2018 and were maintained online to provide revocation status information only.

Certification authority's responsibilities

Verizon Terremark's management is responsible for its assertion, including the fairness of its presentation, and the provision of its described services in accordance with the Trust Services Principles and Criteria for Certification Authorities v2.0.

Société civile ayant emprunté la forme d'une société coopérative à responsabilité limitée
Burgelijke vennootschap die de rechtsvorm van een coöperatieve vennootschap met beperkte aansprakelijkheid heeft anngenomen
RPM Bruxelles – RPR Brussel – T.V.A. – B.T.W. BE 0446.334.711
Banque BNP Paribas Fortis Bank 210-0905900-69

Our independence and quality control

We have complied with the independence and other ethical requirements of the *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

The firm applies International Standard on Quality Control 1, and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Auditor's responsibilities

Our responsibility is to express an opinion on management's assertion based on our procedures. We conducted our procedures in accordance with International Standard on *Assurance Engagements 3000, Assurance Engagements Other than Audits or Reviews of Historical Financial Information*, issued by the International Auditing and Assurance Standards Board. This standard requires that we plan and perform our procedures to obtain reasonable assurance about whether, in all material respects, management's assertion is fairly stated, and, accordingly, included:

1. obtaining an understanding of Verizon Terremark's key and certificate lifecycle management business practices and its controls over key and certificate integrity, over the authenticity and confidentiality of subscriber and relying party information, over the continuity of key and certificate lifecycle management operations and over development, maintenance and operation of systems integrity;
2. selectively testing transactions executed in accordance with disclosed key and certificate lifecycle management business practices;
3. testing and evaluating the operating effectiveness of the controls; and
4. performing such other procedures as we considered necessary in the circumstances.

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

Relative effectiveness of controls

The relative effectiveness and significance of specific controls at Verizon Terremark 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.

Inherent limitations

Because of the nature and inherent limitations of controls, Verizon Terremark's ability to meet the aforementioned criteria may be affected. For example, 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. Also, the projection of any conclusions based on our findings to future periods is subject to the risk that changes may alter the validity of such conclusions.

Opinion

In our opinion, throughout the period May 1, 2017 through April 30, 2018, Verizon Terremark management's assertion, as referred to above, is fairly stated, in all material respects, in accordance with the Trust Services Principles and Criteria for Certification Authorities v2.0.

This report does not include any representation as to the quality of Verizon Terremark's services beyond those covered by the Trust Services Principles and Criteria for Certification Authorities v2.0, nor the suitability of any of Verizon Terremark's services for any customer's intended purpose.

Use of the WebTrust seal

Verizon Terremark's use of the WebTrust Principles and Criteria for Certification Authorities Seal constitutes a symbolic representation of the contents of this report and it is not intended, nor should it be construed, to update this report or provide any additional assurance.

Ernst & Young Bedrijfsrevisoren BCVBA
Diegem, Belgium

Christel Weymeersch, Partner
July 27, 2018

Appendix A - Certification Practice Statements and Certificate Policies in Scope

Certificate Policies	Begin Effective Date	End Effective Date
Version 2.8	April 2017	July 2018

Certification Practice Statements	Begin Effective Date	End Effective Date
Version 5.9	April 2017	July 2018

Appendix B - In-Scope CAs

	OV SSL Issuing CAs	
#	**Subject**	**SHA**
1	C=NL, L=Amsterdam, O=Verizon Enterprise Solutions, OU=Cybertrust, CN=Verizon Akamai SureServer CA G14-SHA1	9c:fb:49:f8:52:05:72:fd:a3:43:69:8b:c0:43:07:c8: 56:b4:f1:81:9b:1d:73:4b:cd:40:aa:c8:f1:e1:6c:2d
2	C=NL, L=Amsterdam, O=Verizon Enterprise Solutions, OU=Cybertrust, CN=Verizon Akamai SureServer CA G14-SHA2	73:73:d2:19:b4:25:47:e4:1b:cb:75:2b:cb:cb:e9:3f: 59:2f:f6:f9:9c:34:0c:e5:7b:73:d3:8c:3e:c0:ba:98
3	CN=Verizon Public SureServer CA G14-SHA1, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	e3:78:e4:39:73:6c:19:6b:47:29:42:fe:7f:bf:a1:e1: 78:cc:7b:8a:f0:c1:c8:6a:b6:88:e2:d0:39:78:24:32
4	CN=Verizon Public SureServer CA G14-SHA2, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	67:5c:1c:5d:bb:08:e9:fa:2c:81:7b:86:d5:fc:89:68: 10:34:9a:2f:47:dd:64:93:8a:2b:ac:a6:49:97:c8:bb
5	CN=Cybertrust Public SureServer SV CA, O=Cybertrust Inc	48:29:e6:06:69:1f:5e:55:b4:48:58:7d:5c:09:99:b0: da:5d:d3:1c:12:73:e3:57:38:cb:92:e5:3c:d7:88:e1
6	CN=Verizon Global Issuing CA, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	cf:58:df:be:c6:68:2f:eb:ba:a4:26:c9:2a:5a:ab:92: 29:a1:2d:bd:1c:71:bf:0f:b0:3f:7f:eb:76:99:5f:9a

	EV SSL Issuing CAs	
#	**Subject**	**SHA**
7	CN=Verizon Public SureServer EV SSL CA G14-SHA2, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	d1:4e:da:2c:63:1f:31:2d:c0:fd:8d:7b:34:9e:d4:a1: c8:d9:04:a0:70:99:2d:84:d3:3d:bf:bb:14:62:1c:42

8	O=Verizon Cybertrust Security, CN=Cybertrust SureServer EV OCSP CA	4f:66:20:f1:5b:d0:8c:95:27:db:50:ce:f2:6f:42:d4: 51:63:b5:10:bb:95:6e:9e:9e:83:c9:9b:82:c0:af:71
9	CN=Verizon Public SureServer EV SSL CA G14-SHA1, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	3c:3a:c7:c5:48:aa:80:0b:ec:7a:af:e3:8a:15:50:ec: cf:f8:89:53:05:c4:36:f7:a0:7c:60:66:a5:ef:55:bd
10	CN=Cybertrust Public SureServer EV CA, O=Cybertrust Inc	93:62:f2:ff:28:71:f3:b8:db:11:56:6f:3d:f5:c4:ac: 35:ec:a6:63:f6:d3:12:b1:a6:1a:a0:48:2f:9c:b6:d2
11	CN=Cybertrust SureServer EV CA, O=Cybertrust Inc	0a:ca:d3:97:3a:8d:ea:50:96:ae:25:53:f5:a7:0f:c9: 16:87:93:fa:0b:06:44:a0:8a:8e:9b:85:9d:96:50:b5

Secure Email (S/MIME) CAs		
#	**Subject**	**SHA**
12	CN=Cybertrust Public SureCredential CA, O=Cybertrust Inc	97:30:91:b2:62:22:d4:53:4f:81:ab:12:cb:cb:37:28: 68:83:ed:c5:87:e6:15:dd:37:ea:d4:c8:fc:4d:02:6d
13	CN=Verizon Public SureCredential CA G14-SHA1, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	8f:69:e4:3a:30:2b:5a:c6:3b:61:1f:8b:80:e1:42:1e: d6:65:cc:23:c6:48:a3:2e:c8:d5:a9:ac:71:0a:32:46
14	CN=Verizon Public SureCredential CA G14-SHA2, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	86:f8:db:cb:37:4f:e3:3d:d1:bf:e3:ae:b3:39:79:24: 35:7f:87:77:f4:57:9e:dc:99:9d:65:e1:11:87:f0:72

Other CAs		
#	**Subject**	**SHA**
15	CN=Verizon Public SureCodeSign CA G14-SHA2, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	fe:b9:15:62:8c:97:9e:06:f1:71:80:5d:6d:27:02:c0: 27:04:20:bd:46:bf:60:11:d0:36:23:fc:93:24:54:fc

16	CN=Verizon Public SureCodeSign CA G14-SHA1, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	2d:1d:6f:5f:b9:62:cd:e8:df:a2:61:90:28:22:2b:a3: a2:3f:52:32:b5:52:8f:03:74:84:2b:61:38:34:e2:01
17	CN=Cybertrust Public SureCodeSign CA, O=Cybertrust Inc	01:22:40:47:8d:e9:d4:45:55:94:7b:b1:a8:ff:5b:c0: e9:ac:27:2f:c0:94:c0:a8:71:72:ee:9c:1a:9c:e0:86

Verizon Terremark Management's Assertion

Verizon Terremark NV ("Verizon Terremark") operates the Certification Authority (CA) services known as the Subordinate CAs as disclosed in appendix B and provides the following CA services:

- Subscriber registration
- Certificate renewal
- Certificate rekey
- Certificate issuance
- Certificate distribution
- Certificate revocation
- Certificate validation

The management of Verizon Terremark is responsible for establishing and maintaining effective controls over its CA operations, including its CA business practices disclosure on its website, 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.

There are inherent limitations in any controls, including the possibility of human error, and the circumvention or overriding of controls. Accordingly, even effective controls can only provide reasonable assurance with respect to Verizon Terremark's Certification Authority operations. Furthermore, because of changes in conditions, the effectiveness of controls may vary over time.

Verizon Terremark management has assessed its disclosures of its certificate practices and controls over its CA services. Based on that assessment, in Verizon Terremark management's opinion, in providing its Certification Authority (CA) services at Culliganlaan 2E, Diegem (Belgium), throughout the period May 1, 2017 through April 30, 2018, Verizon Terremark has:

- Disclosed its business, key lifecycle management, certificate lifecycle management, and CA environmental control practices in the applicable versions of the Certificate Practice Statement and Certificate Policy, as stipulated in Appendix A

- Maintained effective controls to provide reasonable assurance that:
  - Verizon Terremark's Certification Practice Statement(s) are consistent with its Certificate Policies as enumerated in Appendix A.
  - Verizon Terremark provides its services in accordance with its Certificate Policies and Certification Practice Statements as enumerated in Appendix A.

- 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;
  - subscriber information is properly authenticated (for the registration activities performed by Verizon Terremark); and
  - subordinate CA certificate requests are accurate, authenticated, and approved

- Maintained effective controls to provide reasonable assurance that:
  - logical and physical access to CA systems and data is restricted to authorised individuals;
  - the continuity of key and certificate management operations is maintained; and

    ○ CA systems development, maintenance, and operations are properly authorised and performed to maintain CA systems integrity

in accordance with the [Trust Services Principles and Criteria for Certification Authorities v2.0](#), including the following:

CA Business Practices Disclosure

- Certification Practice Statement (CPS)
- Certificate Policy (CP)

CA Business Practices Management

- Certificate Policy 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
- Business Continuity Management
- Monitoring and Compliance
- Audit Logging

CA Key Lifecycle Management Controls

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

Certificate Lifecycle Management Controls

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

Subordinate CA Certificate Lifecycle Management Controls

- Subordinate CA Certificate Lifecycle Management

Verizon Akamai SureServer CA G14-SHA1 (Appendix B, CA #1) ,Verizon Akamai SureServer CA G14-SHA2 (Appendix B, CA #2) ,Verizon Public SureServer CA G14-SHA1 (Appendix B, CA #3) ,Cybertrust Public SureServer SV CA (Appendix B, CA #5) ,Verizon Global Issuing CA (Appendix B, CA #6) ,Cybertrust SureServer EV OCSP CA (Appendix B, CA #8) ,Verizon Public SureServer EV SSL CA G14-SHA1 (Appendix B, CA #9) ,Cybertrust Public SureServer EV CA (Appendix B, CA #10) ,Cybertrust SureServer EV CA (Appendix B, CA #11) ,Cybertrust Public SureCredential CA (Appendix B, CA #12) ,Verizon Public SureCredential CA G14-SHA1 (Appendix B, CA #13) ,Verizon Public SureCodeSign CA G14-SHA1 (Appendix B, CA #16) ,Cybertrust Public SureCodeSign CA (Appendix B, CA #17) did not issue certificates during the period May 1, 2017 through April 30, 2018 and were maintained online to provide revocation status information only.

Verizon Terremark
Diegem, Belgium

Signed by: **Tim Brophy**
Function: **Director, Risk & Compliance**
July 27, 2018

Appendix A - Certification Practice Statements and Certificate Policies in Scope

Certificate Policies	Begin Effective Date	End Effective Date
Version 2.8	April 2017	July 2018

Certification Practice Statements	Begin Effective Date	End Effective Date
Version 5.9	April 2017	July 2018

Appendix B - In-Scope CAs

OV SSL Issuing CAs

#	Subject	SHA
1	C=NL, L=Amsterdam, O=Verizon Enterprise Solutions, OU=Cybertrust, CN=Verizon Akamai SureServer CA G14-SHA1	9c:fb:49:f8:52:05:72:fd:a3:43:69:8b:c0:43:07:c8: 56:b4:f1:81:9b:1d:73:4b:cd:40:aa:c8:f1:e1:6c:2d
2	C=NL, L=Amsterdam, O=Verizon Enterprise Solutions, OU=Cybertrust, CN=Verizon Akamai SureServer CA G14-SHA2	73:73:d2:19:b4:25:47:e4:1b:cb:75:2b:cb:cb:e9:3f: 59:2f:f6:f9:9c:34:0c:e5:7b:73:d3:8c:3e:c0:ba:98
3	CN=Verizon Public SureServer CA G14-SHA1, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	e3:78:e4:39:73:6c:19:6b:47:29:42:fe:7f:bf:a1:e1: 78:cc:7b:8a:f0:c1:c8:6a:b6:88:e2:d0:39:78:24:32
4	CN=Verizon Public SureServer CA G14-SHA2, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	67:5c:1c:5d:bb:08:e9:fa:2c:81:7b:86:d5:fc:89:68: 10:34:9a:2f:47:dd:64:93:8a:2b:ac:a6:49:97:c8:bb
5	CN=Cybertrust Public SureServer SV CA, O=Cybertrust Inc	48:29:e6:06:69:1f:5e:55:b4:48:58:7d:5c:09:99:b0: da:5d:d3:1c:12:73:e3:57:38:cb:92:e5:3c:d7:88:e1
6	CN=Verizon Global Issuing CA, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	cf:58:df:be:c6:68:2f:eb:ba:a4:26:c9:2a:5a:ab:92: 29:a1:2d:bd:1c:71:bf:0f:b0:3f:7f:eb:76:99:5f:9a

EV SSL Issuing CAs

#	Subject	SHA

7	CN=Verizon Public SureServer EV SSL CA G14-SHA2, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	d1:4e:da:2c:63:1f:31:2d:c0:fd:8d:7b:34:9e:d4:a1: c8:d9:04:a0:70:99:2d:84:d3:3d:bf:bb:14:62:1c:42
8	O=Verizon Cybertrust Security, CN=Cybertrust SureServer EV OCSP CA	4f:66:20:f1:5b:d0:8c:95:27:db:50:ce:f2:6f:42:d4: 51:63:b5:10:bb:95:6e:9e:9e:83:c9:9b:82:c0:af:71
9	CN=Verizon Public SureServer EV SSL CA G14-SHA1, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	3c:3a:c7:c5:48:aa:80:0b:ec:7a:af:e3:8a:15:50:ec: cf:f8:89:53:05:c4:36:f7:a0:7c:60:66:a5:ef:55:bd
10	CN=Cybertrust Public SureServer EV CA, O=Cybertrust Inc	93:62:f2:ff:28:71:f3:b8:db:11:56:6f:3d:f5:c4:ac: 35:ec:a6:63:f6:d3:12:b1:a6:1a:a0:48:2f:9c:b6:d2
11	CN=Cybertrust SureServer EV CA, O=Cybertrust Inc	0a:ca:d3:97:3a:8d:ea:50:96:ae:25:53:f5:a7:0f:c9: 16:87:93:fa:0b:06:44:a0:8a:8e:9b:85:9d:96:50:b5

Secure Email (S/MIME) CAs		
#	**Subject**	**SHA**
12	CN=Cybertrust Public SureCredential CA, O=Cybertrust Inc	97:30:91:b2:62:22:d4:53:4f:81:ab:12:cb:cb:37:28: 68:83:ed:c5:87:e6:15:dd:37:ea:d4:c8:fc:4d:02:6d
13	CN=Verizon Public SureCredential CA G14-SHA1, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	8f:69:e4:3a:30:2b:5a:c6:3b:61:1f:8b:80:e1:42:1e: d6:65:cc:23:c6:48:a3:2e:c8:d5:a9:ac:71:0a:32:46
14	CN=Verizon Public SureCredential CA G14-SHA2, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	86:f8:db:cb:37:4f:e3:3d:d1:bf:e3:ae:b3:39:79:24: 35:7f:87:77:f4:57:9e:dc:99:9d:65:e1:11:87:f0:72

Other CAs		
#	**Subject**	**SHA**

15	CN=Verizon Public SureCodeSign CA G14-SHA2, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	fe:b9:15:62:8c:97:9e:06:f1:71:80:5d:6d:27:02:c0: 27:04:20:bd:46:bf:60:11:d0:36:23:fc:93:24:54:fc
16	CN=Verizon Public SureCodeSign CA G14-SHA1, OU=Cybertrust, O=Verizon Enterprise Solutions, L=Amsterdam, C=NL	2d:1d:6f:5f:b9:62:cd:e8:df:a2:61:90:28:22:2b:a3: a2:3f:52:32:b5:52:8f:03:74:84:2b:61:38:34:e2:01
17	CN=Cybertrust Public SureCodeSign CA, O=Cybertrust Inc	01:22:40:47:8d:e9:d4:45:55:94:7b:b1:a8:ff:5b:c0: e9:ac:27:2f:c0:94:c0:a8:71:72:ee:9c:1a:9c:e0:86